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THIS REPORT CONTAINS INFORMATION RECOMMENDED IN THE DOCUMENT ENTITLED "GUIDANCE ON SETTING PERMIT CONDITIONS AND REPORTING TRIAL BURN RESULTS" (EPA/612/6-89/019), JANUARY 1989, AND HAS BEEN ORGANIZED INTO THE FOLLOWING NINE SECTIONS: (1) SUMMARY. (2) PROCESS OPERATION. (3) SAMPLING AND MONITORING PROCEDURES. (4) ANALYTICAL PROCEDURES. (5) TEST RESULTS. (6) QUALITY ASSURANCE SUMMARY. (7) VISITS AND AUDIT SUMMARY. (8) CLOSURE. (9) CONCLUSIONS.

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PROGRAM MANAGER FOR
ROCKY MOUNTAIN ARSENAL

INTERIM RESPONSE ACTION

BASIN F LIQUID INCINERATION PROJECT

DRAFT FINAL

TRIAL BURN REPORT

VOLUME I

SEPTEMBER 1993

WESTON
MANAGERS DESIGNERS CONSULTANTS

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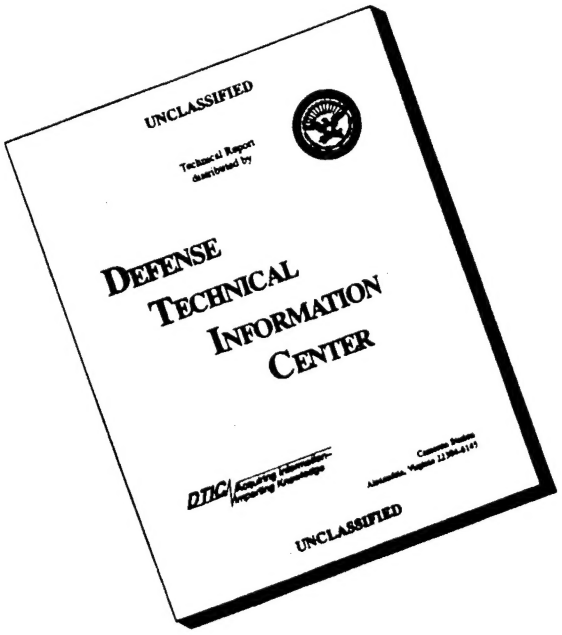

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TRIAL BURN SUMMARY REPORT
FOR THE INTERIM RESPONSE ACTION
BASIN F SUBMERGED QUENCH INCINERATION PROJECT

VOLUME I

DRAFT FINAL

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September 1993

Work Order No. 05189-008-001-7020

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (Written in accordance with 40 CFR 270.11).

ROY F. WESTON, INC.
James H. Dougherty
President, Treatment Systems Department

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LIST OF ACRONYMS

acfs	SQI chamber volume/gas flow rate
BNA	semivolatiles
BR	Brine
CDAP	Chemical Data Acquisition Plan
CDH	Colorado Department of Health
CDM	Camp Dresser & McKee
CEM	continuous emissions monitoring
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
CO	carbon monoxide
CO_2	carbon dioxide
CRO	control room operator
CS	caustic solution
DQOs	data quality objectives
DRE	destruction and removal efficiency
EPA	Environmental Protection Agency
FIT-04A	Micro-Motion flow transmitter
gr/dscf	grains per dry standard cubic foot
HCl	hydrochloric acid
IDL	instrument detection limit
IRA	Interim Response Action
ITO	Independent Technical Oversite representative
LW	liquid waste
MG	million gallons
MW	makeup water
NO_x	nitrogen oxides
O_2	oxygen
OCP	chlorinated pesticides/PCBs
OP Pest	organo-phosphorous pesticide compounds
OPPs	organophosphorus pesticides
PCDDs	polychlorinated dibenzo-p-dioxins
PE	Performance Evaluation
PeCDD	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
PeCDF	2,3,4,7,8-Pentachlorodibenzofuran
Pest/PCB	pesticide/PCB compounds
PICs	products of incomplete combustion
PIT-31	Rosemount pressure transmitter
PMCS	Process Monitoring and Control System
POHCs	principal organic hazardous constituents
QA/QC	quality assurance and quality control
RMA	Rocky Mountain Arsenal
Shell	Shell Oil Company

LIST OF ACRONYMS
(Continued)

SO_2	Sulfur Dioxide
SOPs	standard operation procedures
SOW	Statement of Work
SQI	Submerged Quench Incinerator
TBP	Trial Burn Plan
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	2,3,7,8-Tetrachlordibenzofuran
TCL	target compound list
TDF	total dioxins/furans
TDS	total dissolved solids
TEF	toxic equivalency factor
THC	Total Hydrocarbons
VOA	volatiles
VOST	Volatile Organic Sampling Train
wc	water column
WESTON®	Roy F. Weston, Inc.

EXECUTIVE SUMMARY

A Trial Burn test program consisting of three runs performed under identical test conditions was conducted on the Submerged Quench Incinerator (SQI) located at the Rocky Mountain Arsenal (RMA) in Adams County, Colorado from 10-12 June 1993. This test program followed the approved Trial Burn Plan (submitted September 1992) and subsequent revisions. The oversite groups witnessing the test runs consisted of the U.S. Environmental Protection Agency (EPA), Region VIII; Colorado Department of Health (CDH); Entropy; Camp Dresser & McKee (CDM); and the Independent Technical Oversite (ITO) representative, Fluor-Daniel.

A summary of the operating parameters and results from the three tests conducted during the Trial Burn is provided in Table ES-1. The SQI was in compliance with federal and state guidelines for destruction and removal efficiency (DRE), particulate, hydrogen chloride (HCl), and carbon monoxide (CO) emissions while processing a maximum rate of 179.9 lb/min (18 gpm) of 100% Basin F liquid at an average incinerator temperature of 1835°F.

In order to determine the destruction and removal efficiency of the SQI, the Basin F liquid was spiked with two principal organic hazardous constituents (POHCs). A DRE >99.9990% was demonstrated for monochlorobenzene and >99.9988% was demonstrated for carbon tetrachloride. Both results are better than the minimum regulatory requirement of a DRE >99.99%.

Particulate emissions averaged 0.0214 gr/dscf (corrected to 7% O_2) and 0.0320 gr/dscf (corrected to 12% CO_2). Both values are below the regulatory limits of less than 0.08 gr/dscf (corrected to 7% O_2) and less than 0.10 gr/dscf (corrected to 12% CO_2). HCl emissions averaged 0.229 lb/hr (>97.9% removal), well below the 4 lb/hr regulatory limit. The CO hourly rolling average was 51.5 ppm, less than the regulatory limit 100 ppm.

Table ES-1

Summary of Operating Parameters and Results from the SQI Trial Burn

Parameter	Day #1 10 June	Day #2 11 June	Day #3 12 June	Average	Interim Conditions
Waste Feedrate	171.1 lb/min	176.9 lb/min	179.9 lb/min	176 lb/min	<166 lb/min
SQI Chamber Temperature	1842°F	1831°F	1835°F	1836°F	>1825°F
Residence Time	2.81 sec	2.67 sec	2.68 sec	2.72 sec	>2.7 sec
Excess Oxygen	3.37%	3.74%	3.40%	3.50%	>3%
CO Hourly Rolling Average	49.5 ppm	47.4 ppm	57.6 ppm	51.5 ppm	<100 ppm
Quench pH	Field = 5.0	Field = 5.25	Field = 5.19	Field = 5.15	>4 pH
Scrubber pH	Field = 5.7	Field = 6.07	Field = 5.48	Field = 5.75	>5.25 pH
Venturi Recycle Flowrate	128.9 gpm	125.4 gpm	125.9 gpm	126.7 gpm	> 100 gpm
Venturi Differential Pressure	90" w.c.	90" w.c.	90" w.c.	90" w.c.	>80" w.c.
L/G Ratio	11.6 gal/kcf	10.8 gal/kcf	10.8 gal/kcf	11.1 gal/kcf	>9.3 gal/kcf
Scrubber Recycle Flowrate	295.6 gpm	280.7 gpm	280.9 gpm	285.7 gpm	>270 gpm
DRE - Carbon Tetrachloride DRE - Chlorobenzene	99.9988% 99.9996%	99.9990% 99.9990%	99.9990% 99.9990%	99.9989% 99.9992%	>99.99%
Particulate - @7% O_2 Particulate - @12% CO_2	0.0194 gr/dscf 0.0290 gr/dscf	0.0238 gr/dscf 0.0360 gr/dscf	0.0209 gr/dscf 0.0311 gr/dscf	0.0214 gr/dscf 0.0320 gr/dscf	<0.08 gr/dscf <0.10 gr/dscf
HCL Emissions	0.1273 lb/hr	0.3103 lb/hr	0.2497 lb/hr	0.2291 lb/hr	<4 lb/hr

Stack sampling for volatile organics, semivolatile organics, pesticides, dioxins/furans, metals, and hexavalent chromium was performed. Process sampling for the waste feed, POHCs, makeup water, caustic, and brine was also performed. All data presented have passed the rigorous quality assurance and quality control (QA/QC) defined in the Trial Burn Plan.

The SQI is currently operating under interim conditions, defined in Table ES-1, that were formally approved by EPA Region VIII in their letter to the Army (Ref: 8HWM-FF). The interim conditions were based upon the demonstrated results of the second mini-burn test, conducted 20-25 May 1993. These are conservative values that will remain in effect until the proposed operating conditions contained in Table 9-1 of this Trial Burn Report have been approved.

SECTION 1
SUMMARY

1.1 INTRODUCTION

A Trial Burn program was conducted on the Submerged Quench Incinerator (SQI) located at the Rocky Mountain Arsenal (RMA or the Arsenal) from 10-12 June 1993. The SQI is designed to thermally destroy the organic components found in Basin F liquid. The SQI employs a single-stage combustion process for incineration of liquid wastes. The combustion chamber has a downfired 30 million Btu/hr natural gas burner. Combustion gases are pushed through a brine solution at the bottom of the combustion chamber, which quenches the gas temperature to approximately 200°F. Flue gas is treated by a pollution control system that removes particulate and neutralizes acid gases.

Trial burn activities were performed by the SQI Operations Team. WESTON was contracted to provide technical direction to the Operations Team and to provide sampling and laboratory analysis for the Trial Burn. A summary of the test runs is given below:

- Test Run 1: 10 June 1993 from 0745 - 1552.
- Test Run 2: 11 June 1993 from 0710 - 1341.
- Test Run 3: 12 June 1993 from 0756 - 1440.

1.2 BACKGROUND

The SQI technology was selected by the Department of the Army (Army) for remediation of Basin F liquids at RMA. RMA is located approximately 10 miles northeast of downtown Denver and immediately north of Stapleton Airport in Adams County, Colorado. Figure 1-1 shows the RMA site location and the surrounding Denver area.

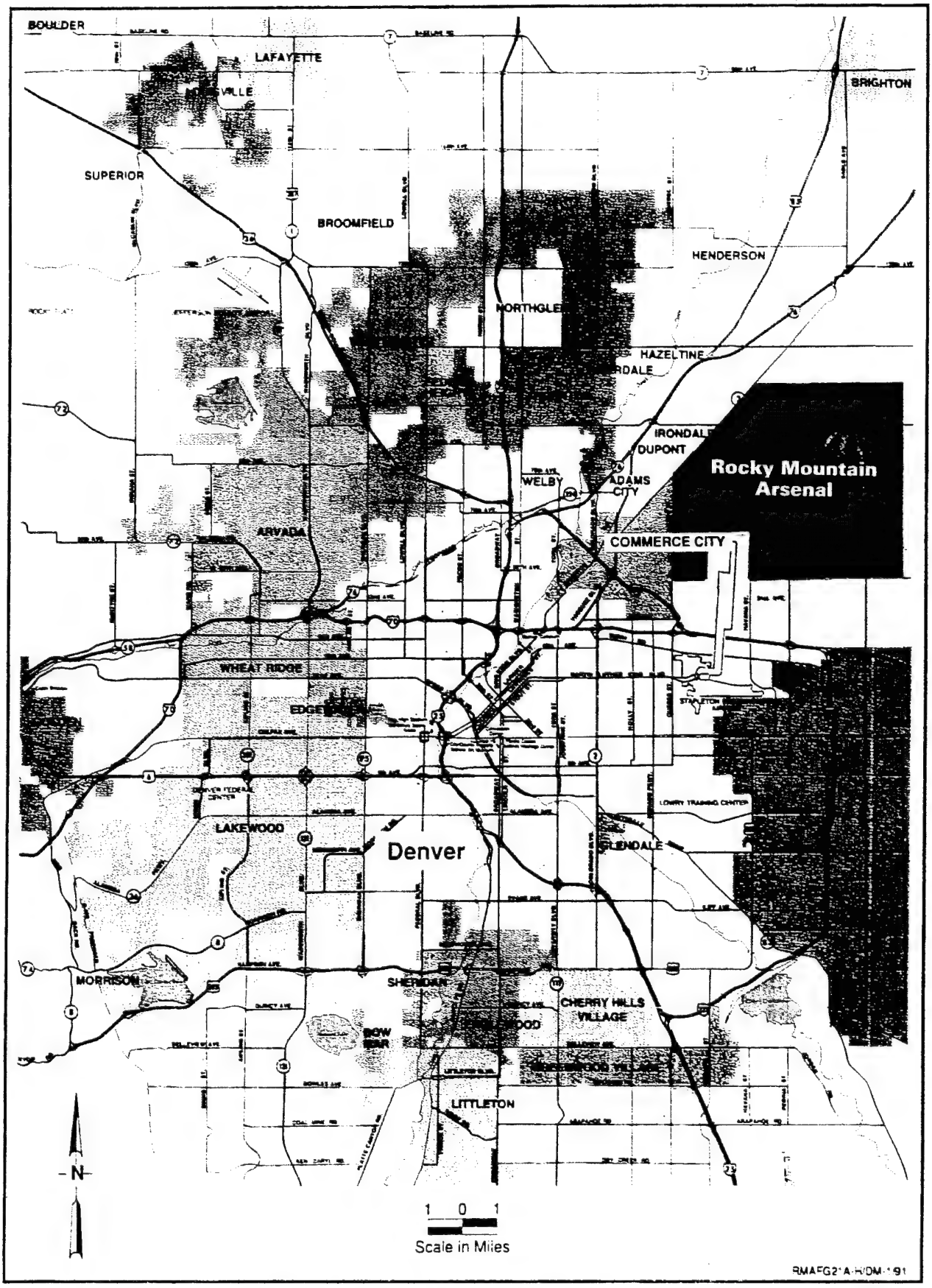


FIGURE 1-1 SITE LOCATION MAP - ROCKY MOUNTAIN ARSENAL

RMA was established in 1942 to manufacture chemical weapons and conventional munitions for World War II. After the war, a portion of the manufacturing facility was leased to private industry for the production of herbicides and insecticides. From 1947 until 1982, industrial chemicals were manufactured at RMA. In addition, between 1953 and 1957, RMA was used for the production of GB nerve agent. Munitions continued to be filled with GB at the Arsenal until approximately 1969. In the 1970s, the primary mission of RMA was the disposal of chemical warfare material, mustard agent, explosive components, and the destruction of the GB agent by caustic neutralization and incineration. The current mission of RMA is contamination cleanup; there is no operational military mission. Over the years, wastes from the military and industrial operations have been disposed of in accordance with standard engineering practices in existence at the time. These disposal practices have resulted in the contamination of soil and groundwater.

In 1956, Basin F, a lined evaporative pond, was constructed in the northern part of RMA (Figure 1-2). Basin F had a surface area of 92.7 acres and a capacity of approximately 243 million gallons (MG). The basin was created by the construction of a dike around a natural depression and was lined with a 3/8-inch asphalt membrane. An earthen blanket approximately 1 foot thick was placed on top of the membrane. Wastes were conveyed to the basin from the manufacturing facilities through an underground industrial sewer constructed of vitrified clay pipe. It was subsequently discovered that the liquids in Basin F contained hazardous organic and inorganic constituents.

In 1986, the Army, Shell Oil Company (Shell), and the U.S. Environmental Protection Agency (EPA) Region VIII agreed to undertake an accelerated remediation to contain the liquid and contaminated soils in and under Basin F pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This remediation has been addressed in two parts. The first part of the Basin F Interim Response Action (IRA), which has been completed, included the removal of Basin F liquid to storage tanks and a double-lined surface impoundment (Pond A) and the removal and stockpiling of soil and sludge to a double-lined waste pile, which was subsequently capped.

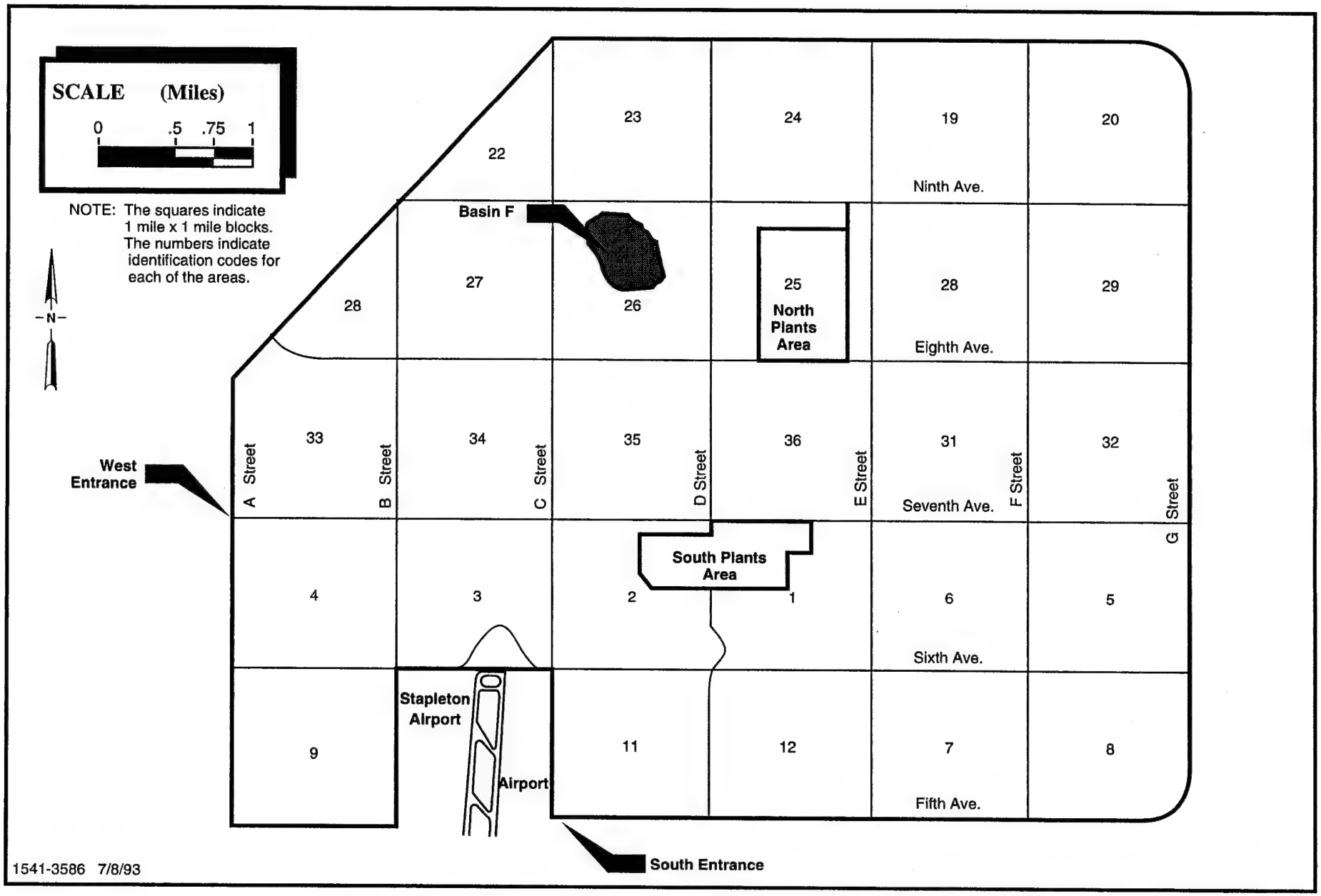


FIGURE 1-2 FORMER BASIN F LOCATION - ROCKY MOUNTAIN ARSENAL

The second part of the IRA calls for treatment of the Basin F liquid contained in the three storage tanks and Pond A. The Army selected a Submerged Quench Incinerator (SQI) as the preferred treatment method.

In May 1990, the Army issued the Final Decision Document for Basin F Liquid Treatment. The recommended treatment concept included a SQI with a venturi/packed tower scrubber for Basin F liquid. The SQI is manufactured and marketed by T-Thermal, Inc. of Conshohocken, Pennsylvania.

Construction of the SQI facility was completed in December of 1992. Following two months of rigorous systems checks, refractory dry-out began in early March 1993. Surrogate testing, using various concentrations of water, sodium chloride, sodium sulfate, ammonium chloride and methanol, was completed in late April 1993. Hazardous waste operations with varying concentrations of Basin F waste and water solutions followed, with two mini-burn tests using 50% and 100% Basin F waste conducted in May 1993. Both mini-burn tests demonstrated a DRE greater than 99.99%, and confirmed the effectiveness and safety of the incinerator in treating Basin F liquid. Mini-burn test summaries are contained in Appendix A.3.

1.3 OBJECTIVES OF THE TRIAL BURN

Trial Burn objectives listed below were defined in order to establish criteria for the acceptance of the SQI and determine conditions to be maintained during routine operations.

- Demonstrate a contaminant destruction and removal efficiency (DRE) of at least 99.99% for each of the principal organic hazardous constituents (POHCs), monochlorobenzene and carbon tetrachloride.
- Demonstrate a minimum hydrochloric acid (HCl) removal of 99% with the selected air pollution control devices, or less than 4 pounds per hour of HCl emissions.

- Demonstrate a maximum particulate emission of less than 0.08 grains per dry standard cubic foot (gr/dscf) corrected to 7% oxygen, and less than 0.10 gr/dscf corrected to 12% CO_2.

1.4 DOCUMENT ORGANIZATION

This report contains the information recommended in the document entitled *Guidance on Setting Permit Conditions and Reporting Trial Burn Results* (EPA/612/6-89/019), January 1989, and has been organized into the following nine sections:

Section	Title
1	Summary
2	Process Operation
3	Sampling and Monitoring Procedures
4	Analytical Procedures
5	Test Results
6	Quality Assurance Summary
7	Visits and Audit Summary
8	Closure
9	Conclusions

SECTION 2
PROCESS OPERATION

2.1 GENERAL OVERVIEW OF THE PROCESS

The SQI is composed of three main processing areas:

- Waste Feed System
- Submerged Quench Incinerator
- Flue Gas Treatment and Emissions Control

A block diagram of the process flow is provided in Figure 2-1. A discussion of the process is provided in the following subsections.

2.1.1 Waste Feed System

The function of the waste feed system is to transfer Basin F liquid and any wastewater (residual process water from decontamination, outdoor/indoor sumps, purge water, etc.) to the SQI combustion chamber. There are approximately 10.5 million gallons (MG) of Basin F liquid stored in Pond A and storage tanks TK-101, TK-102 and TK-103. During the Trial Burn, 100% Basin F liquid was transferred from storage tank TK-102 into two 14,000-gallon capacity day tanks (TK-105 and TK-106) located adjacent to the SQI building. Wastewater was not blended into the Basin F liquid for Trial Burn testing. From the day tanks, Basin F liquid was pumped to injection nozzles and fed directly into the SQI.

2.1.2 Submerged Quench Incinerator

The function of the SQI is to thermally oxidize and destroy the organic components contained in Basin F liquid. The SQI is designed to operate continually utilizing a fully automated control system operated from the main control room. Waste feed and burner interlocks maintain the incinerator within design parameters and operating conditions.

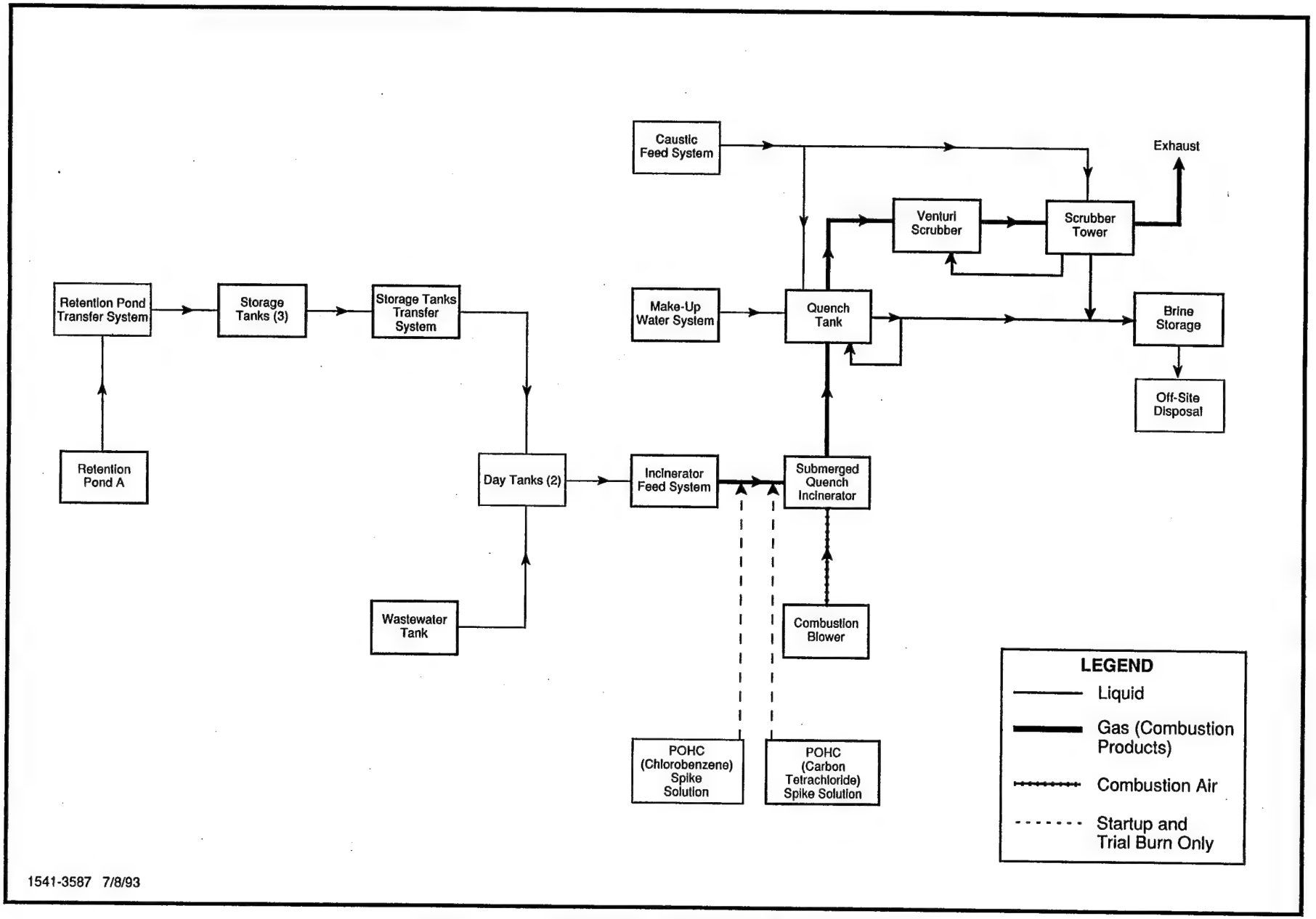


FIGURE 2-1 PROCESS FLOW SCHEMATIC DIAGRAM

Supplementary fuel (natural gas) is fed to a LV-24 burner to heat the SQI chamber. The LV-24 burner has a 30 million btu/hr capacity. Combustion air to the burner and incinerator is supplied by a 600-horsepower combustion air blower. A 250-horsepower compressor supplies the atomizing air necessary for the waste feed injector nozzles. The incinerator combustion chamber is lined with refractory brick and is designed to operate at approximately 1,900° F with a 2-second retention time. The entire system is operated under positive pressure. Basin F liquid, atomizing air and secondary air are injected into the flame zone just below the down-fired burner.

The Basin F liquid contains a high concentration of salts and inorganics. Molten salts are formed in the incineration process because of the high operating temperatures. Molten salts flow down the walls of the combustion chamber and into the quench tank located below the combustion chamber. Combustion gases pass through a downcomer into the quench tank. The cooled gases exit through the quench separator.

Makeup water and caustic are added to the SQI quench tank to control tank level, pH and temperature. Softened makeup water from process water storage tank TK-203 is supplied by domestic water pumps. A dilute caustic solution is stored in tank TK-205 to provide pH control of both the quench tank and scrubber systems. The blowdown rate is controlled by the total dissolved solids (TDS) content of the quench liquid. The blowdown rate is based upon a specific gravity setpoint in the Process Monitoring and Control System (PMCS), which is input from the control room operator (CRO).

The blowdown brine solution, consisting of approximately 20% (by weight) dissolved salts and some residual heavy metals, is transported off-site where the metals are removed and recycled to a smelter. The residual solution is discharged in compliance with a NPDES permit. At the SQI, a brine-handling system was installed to provide on-site storage and transfer facilities for the brine liquid. Two 42,000-gallon storage tanks are designed to store two days of brine production using a blowdown rate of 27 gpm. The storage tanks operate in parallel on a batch basis. One tank is used to fill tank trucks in the brine loading area

while the other tank is receiving brine from the incinerator process. The tank trucks transfer brine to railcars, which transport the brine to a permitted off-site metals recycle facility.

2.1.3 Flue Gas Treatment and Emissions Control

The function of the venturi is to remove particulate from the incinerator exit gases. The function of the packed tower scrubber is to neutralize the acid vapor component of the combustion gas with a caustic solution.

Differential pressure and recycle flowrate across the venturi throat are monitored and controlled to maintain proper particulate removal. The liquid flow into the throat of the venturi is provided by redundant recycle pumps (P-203A/B).

The packed tower scrubber is a vertical, cylindrical tower which uses a caustic solution (sodium hydroxide, NaOH) as the neutralizing agent. The scrubber system consists of pumps P-203A/B, an absorber section, a mist eliminator to remove water droplets from the flue gases and an exhaust stack. Makeup water to the scrubber is required to maintain level due to evaporation and liquid blowdown to the quench/separator system.

A continuous emissions monitoring (CEM) system is provided to monitor the gaseous emissions leaving the stack and to transmit signals from the CEM analyzers back to the PMCS in the main control room. The oxygen analyzer's signal is used to control combustion air flow into the SQI chamber. The carbon monoxide analyzer's signal is averaged by the PMCS to update a rolling hourly average. The CEM is an extractive type system designed to measure the following seven constituents of the stack emissions:

- Oxygen (O_2)
- Carbon Dioxide (CO_2)
- Carbon Monoxide (CO)
- Hydrochloric Acid (HCl)

- Nitrogen Oxides (NO_x)
- Sulfur Dioxide (SO_2)
- Total Hydrocarbons (THC)

Table 2-1 presents a summary of the CEM equipment. The PMCS uses the signals from the O_2 and CO analyzers to compare with approved ranges for waste feed shutoff values.

2.2 PROCESS OPERATION DATA

The process data represent the average values for the parameters measured during the designated test periods. A summary of the pertinent operational data collected during the Trial Burn test program is presented in Table 2-2. The data were extracted from the PMCS Daily Reports and control room operator logs. The raw data collected during the Trial Burn tests are presented in Appendix A (Subsections A.1.1 through A.1.5).

2.2.1 Process Measurement Methods

The process data from the Trial Burn program were collected using the following field instruments:

- Waste Feedrate - The Basin F feedrate was monitored using a Micro-Motion flow transmitter (FIT-04A). The 4-20mA output signal was converted into an equivalent 0-300 lb/min signal, transmitted to the PMCS and averaged on a hourly basis. Calibration data sheets are provided in Appendix A.2.3.

- Process Gas Temperatures - Gas temperatures were measured using "R" and "J"-type thermocouples located throughout the gas stream. The SQI chamber temperature is the numerical average of three thermocouples (TE-34A/B/C). The average chamber temperature is transmitted to the PMCS and averaged on a hourly basis. Calibration data sheets are provided in Appendix A.2.3.

- Process Gas Pressures - SQI chamber pressure was determined using a Rosemount pressure transmitter (PIT-31). The 4-20mA output signal was converted into an equivalent 0-10 psig signal, transmitted to the PMCS and averaged on a hourly basis.

Table 2-1

Continuous Emissions Monitoring Equipment

Parameter	Manufacturer	Model Number	Analytical Principle	Operating Range
Carbon monoxide	Rosemount	880-14	Nondispersive infrared	0-200 ppm CO
Carbon dioxide	Rosemount	870	Nondispersive infrared	0-20% CO_2
Oxygen	Rosemount	755	Paramagnetic	0-25% O_2
Nitrogen oxides	Rosemount	951A	Chemiluminescence	0-1,000 ppm NO_x
Sulfur dioxide	Rosemount	880-16	Nondispersive infrared	0-500 ppm SO_2
Hydrochloric acid	Thermo-Environmental	15	Gas filter correlation	0-100 ppm HCl (0-5 ppm with 20:1 dilution)
Total hydrocarbons	JUM Engineering	VE-7	Flame ionization detector	0-10 ppm THC

Table 2-2

Summary of Operating Parameters During the SQI Trial Burn

Parameter	Day #1 10 June	Day #2 11 June	Day #3 12 June
Waste Feedrate	171.1 lb/min	176.9 lb/min	179.9 lb/min
SQI Chamber Temperature	1842°F	1831°F	1835°F
Residence Time	2.81 sec	2.67 sec	2.68 sec
Oxygen	3.37%	3.74%	3.40%
CO Hourly Rolling Average	49.5 ppm	47.4 ppm	57.6 ppm
Quench pH	Field = 5.0 PMCS = 5.6	Field = 5.25 PMCS = 6.00	Field = 5.19 PMCS = 6.20
Scrubber pH	Field = 5.7 PMCS = 6.0	Field = 6.07 PMCS = 6.07	Field = 5.48 PMCS = 5.37
Venturi Recycle Flowrate	128.9 gpm	125.4 gpm	125.9 gpm
Venturi Differential Pressure	90" w.c.	90" w.c.	90" w.c.
L/G Ratio	11.6 gal/kcf	10.8 gal/kcf	10.8 gal/kcf
Scrubber Recycle Flowrate	295.6 gpm	280.7 gpm	280.9 gpm
Natural Gas	433 scfm	445 scfm	435 scfm
Total Combustion Air	6,582 scfm	7,163 scfm	7,107 scfm
SQI Chamber Pressure	3.97 psig	3.94 psig	4.00 psig
Quench Density	1.19 sgu	1.19 sgu	1.19 sgu
Carbon Dioxide	10.14%	9.74%	10.29%
Total Hydrocarbon	5.53 ppm	9.61 ppm	5.06 ppm
Nitrogen Oxides	119.2 ppm	142.0 ppm	130.7 ppm
Sulfur Dioxide	20.7 ppm	1.13 ppm	145 ppm
Hydrogen Chloride	1.74 ppm	2.07 ppm	3.70 ppm
Carbon Tetrachloride Feedrate	6.90 lb/hr	8.66 lb/hr	8.79 lb/hr
Monochlorobenzene Feedrate	8.66 lb/hr	8.98 lb/hr	8.79 lb/hr

- Liquid Flowrates - Venturi and scrubber recycle flowrates are determined using Rosemount differential pressure transmitters (FIT-60 and FIT-65 respectively). Pressure drop across an orifice plate is converted into a flow signal (gpm), which is transmitted to the PMCS and averaged on a hourly basis. Calibration sheets are provided in Appendix A.2.3.

- POHC Injection Rates - The two POHCs used during testing, monochlorobenzene and carbon tetrachloride, were purchased in pure form and injected into the waste feed stream through metering pumps. The injection rates were determined by differential weight loss over time using certified weigh scales. The weight and time of each POHC drum was manually recorded every 15 minutes during Trial Burn testing. Raw data sheets and the injection rate calculations are attached in Appendix A.1.4. A schematic of the POHC injection system is shown in Figure 2-2.

- Stack Emissions - The stack emissions were measured using an extractive-type CEM system. The CEM system components are fully described in Section 7 of the Trial Burn Plan. A formal Performance Specification Test program was conducted according to 40 CFR 60, Appendix B, for the oxygen and carbon monoxide analyzers prior to the Trial Burn (between April 6-22, 1993). A strip chart recording for O_2, CO_2 and CO during each test run is provided in Appendix A.1.10 and is used as a comparison to the hourly averages calculated by the PMCS and reported in the Daily Reports.

2.3 DEVIATIONS FROM TRIAL BURN PLAN

A summary of the deviations from the Trial Burn Plan is presented in the following subsections.

2.3.1 Process Sample Volumes

In order to have an adequate volume of liquid waste and brine samples, the sample volumes defined in Tables 5-1 and 5-6 of the Trial Burn Plan were increased from 100 ml to 1,000 ml. The sample volumes defined in Tables 5-4 and 5-5 of the Trial burn Plan for makeup water and caustic were increased from 100 ml to 500 ml. All grab samples were composited at the end of each test run.

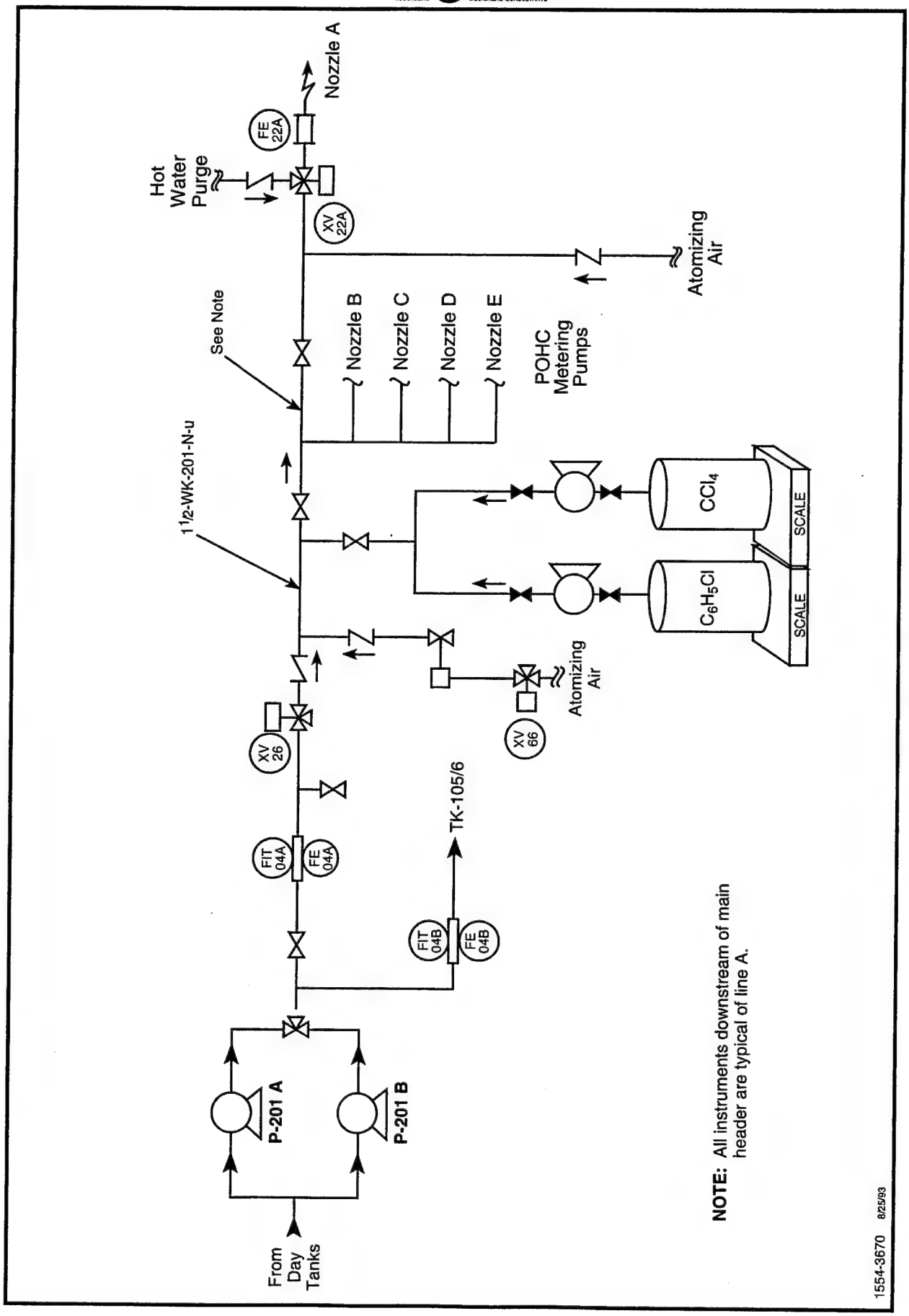


FIGURE 2-2 POHC INJECTION SYSTEM

2.3.2 Sample Preservation

To preserve the integrity of the sample matrices, preservatives were not added to either the liquid waste or caustic samples. Additionally, the cyanide and sulfide samples for the brine were not pH adjusted due to the large amount of caustic required to make the adjustment.

2.3.3 Liquid Waste Audit Requirements

Per request by the EPA during the Trial Burn, the sample type stated in Table 6-7(a) of the Trial Burn Plan was changed from grab to composite for the following parameters: semi-volatiles, pesticides, dioxin/furans, metals, sulfur and total halides.

2.3.4 Performance Evaluation Samples

The EPA provided two Performance Evaluation (PE) samples as an audit of the analytical methods used by the laboratory. One PE sample was characteristic of the liquid waste feed and the other sample was characteristic of the brine. The EPA did not provide samples which were spiked for dioxin/furan, heating value, ash content, pH, TSS or TDS. Therefore, these parameters are not reported in the summary tables in Section 7.

2.3.5 Pesticide Surrogates

Several substitutions were made to the pesticide surrogates defined in Tables 11-5 and 11-6 of the Trial Burn Plan. Inadvertently, the analytical laboratory used routine in-house spiking solutions containing matrix spike compounds different from those defined in the original plan. With respect to the Trial Burn objective to determine the absence or presence of organophosphorous pesticides in Basin F liquids, no adverse effect to useability is presented by the use of the alternate list of spiking compounds for surrogate and matrix spike analysis. Revisions to Tables 11-5 and 11-6 of the Trial Burn Plan are presented in Tables 6-5 and 6-6. Further discussion of the pesticide surrogate substitutions is provided by the Quality Assurance Summary in Section 6.

SECTION 3
SAMPLING AND MONITORING PROCEDURES

3.1 SAMPLING PLAN

This section of the report presents the sampling and monitoring procedures used for the Trial Burn test program. The process and stack sampling was performed by Roy F. Weston, Inc. (WESTON®). Figure 3-1 shows the sampling locations. Tables 3-1 through 3-7 define the sampling and analytical plan for each sample location. Each table summarizes the following elements:

- A description of the system or process being sampled or monitored (i.e. liquid waste, makeup water, caustic, brine, or stack gases).
- Number of test runs.
- Test objectives (i.e. to demonstrate performance of the system).
- Sampling objective (i.e. to collect a representative sample).
- Parameters tested (i.e. volatile organics, metals, density, pH).
- Sampling or monitoring method.
- Extraction/analysis method.
- Sampling or monitoring design (i.e. total no. of samples, no. of blanks).

3.2 SAMPLE IDENTIFICATION

The process samples were collected using the sampling equipment identified in Table 3-8 and labeled using a six letter code (XXYY-ZZ-lab) incorporating:

- Sample description (i.e. XX - liquid feed, brine, makeup water, caustic solution).

- Type of sample (YY - grab, composite, blank).
- Test designation (ZZ - i.e. run 1,2,3).
- Lab abbreviation (used to describe samples which were analyzed for QA/QC purposes).

A detailed listing of the sample description, test designations and laboratory abbreviations for the liquid samples follows:

Sample Description (XX)

LF	Liquid Feed
BR	Brine
MW	Makeup Water
CS	Caustic Solution
AU	Audit

Sample Type (YY)

CP	Composite
GB	Grab
SB	Site Blank
BT	Blank Train
TB	Trip Blank

Lab Abbreviations

MS	Matrix Spike
MSD	Matrix Spike Duplicate
BS	Blank Spike
BSD	Blank Spike Duplicate
DL	Dilution Limit
DF	Dilution Factor
SP	Spiked Compound

Test Designation (ZZ)

RN1	Run 1
RN2	Run 2
RN3	Run 3

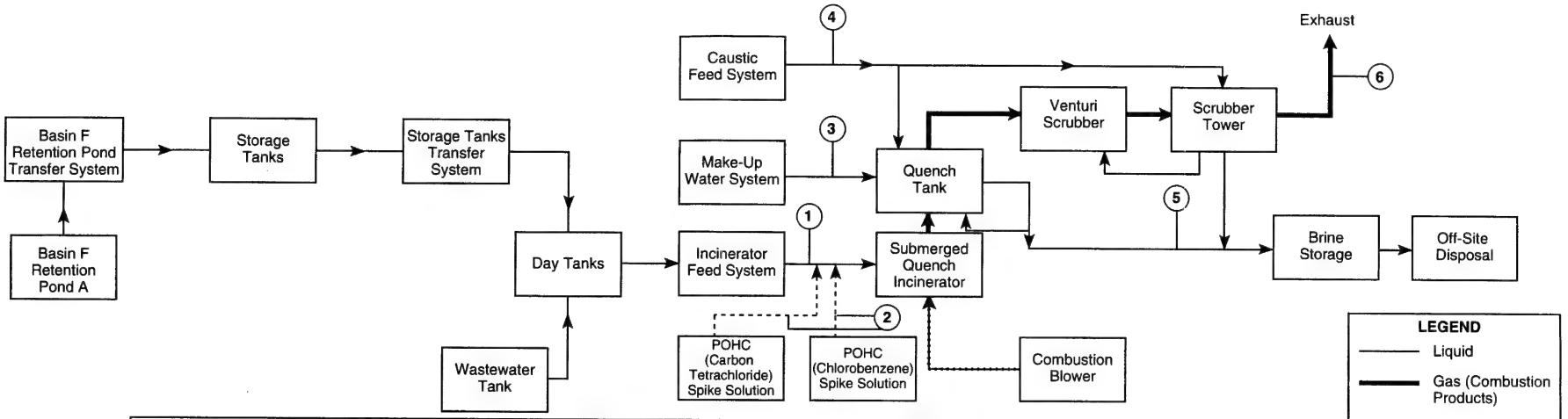
For example, LFCP-RN1 corresponds to the Basin F liquid feed composite sample for test run #1.

Table 3-9 contains a complete listing of the stack gas sample identifiers used on the chain-of-custody sheets provided to the analytical laboratory. The sample method (for example, multi-metals is abbreviated MMTL) is shown in the sample description.

3.3 SAMPLING PROCEDURES

Sampling procedures are summarized in Table 3-10. Included in this table is the following information:

- Description of sample stream.
- EPA reference method.
- Measurement technique.
- Duration of sampling.



	(1) Waste	(2) POHC Spike Solutions	(3) Make-up Water	(4) Caustic Solution	(5) Brine	(6) Stack Gases
Volatile Organics	X	X	X	X	X	X
Semi-Volatile Organics	X		X	X	X	X
Pesticides	X		X	X	X	X
Dioxins/Furans	X		X	X	X	X
Metals	X		X	X	X	X
Particulate						X
Sulfur	X					
Total Halides	X		X	X	X	
Carbon Dioxide						X
Oxygen						X
Carbon Monoxide						X
Nitrogen Oxides						X
Total Hydrocarbons						X
Hydrochloric Acid						X
Density	X			X	X	
Heating Value	X					
Ash Content	X					
pH	X				X	
Water Content	X					X
Total Suspended Solids	X				X	
Total Dissolved Solids	X				X	
Volumetric Flow Rate (Liquids)	X	X	X	X	X	
Volumetric Flow Rate (Gases)						X
PCBs					X	X
Cyanide					X	
Fluoride					X	
Sulfide					X	

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FIGURE 3-1 SAMPLING LOCATIONS AND PARAMETERS TO BE DETERMINED DURING TRIAL BURN

Sampling Point No.:	1														
Description:	Liquid Waste														
No. of Test Runs:	3														
Test Objective:	Determine the DRE of the SQI														
Sampling Objective:	Collect a Representative Sample														
Parameters to be Determined:	Volatile Organics	Semivolatile Organics	Pesticides	Dioxins/ Furans	Metals[1]	Sulfur Content	Total Halides	Density	Heating Value	Ash Content	pH	Water Content	TSS[2]	TDS[3]	Volumetric Flow Rate
Sampling or Monitoring Method:	Two (2) random grab samples (40 mL) per test	Grab sample **(1,000 mL)** collected every 15 minutes. At the end of each test run, grab samples will be composited and placed into appropriate containers for analysis.													Flow Rate measured every 15 minutes by a Flow Meter
Sampling Extraction/ Analysis Method(s):	Method 5030/ Method 8240	Dilution Method/ Method 8270	Dilution Method/ Methods 8080[4] and 8140[4]	Dilution Method/ Method 8290	Digestion Method 3010/ Methods 6010[5] and 7470[5]	Method 300	Method 300	Gravi-metric	ASTM Method D240	Method 160.3	Method 150.1	Method 160	Method 160.2	Method 160.1	
Sampling or Monitoring Design:															
- Total no. of samples	6	3	3	3	3	3	3	3	3	3	3	3	3	3	NA
- Site blanks	1	1	1	1	1	1	1	0	0	1	1	1	1	1	NA
- Trip blanks	1	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
- Lab blanks	1/batch[6]	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	1	1	1	1	1	NA
- Blank spikes[7]	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	0	0	0	0	0	0	0	NA
- Replicates[8]	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	1	1	1	1	1	NA
- Matrix spikes	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	0	0	0	0	0	0	0	NA
- Total no. of samples analyzed	12	8	8	8	8	6	6	3	3	6	6	6	6	6	NA

NOTES:

1. Metals include antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.
2. Total suspended solids.
3. Total dissolved solids.
4. Organochlorine pesticides - Method 8080; organophosphorus pesticides - Method 8140.
5. Arsenic, barium, antimony, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc - Method 6010; mercury - Method 7470.
6. A batch consists of a maximum of 20 samples.
7. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
8. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquots. Replicate sample analysis monitors precision.

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TABLE 3-1 SAMPLING AND MONITORING PLAN FOR LIQUID WASTE

TABLE 3-2
SAMPLING AND MONITORING PLAN
FOR POHC SOLUTION (CARBON TETRACHLORIDE)

Sampling Point No.	2A	
Description:	POHC Solution (Carbon Tetrachloride)	
No. of Test Runs:	3	
Test Objective:	Determine the DRE of the SQI	
Sampling Objective:	Collect Representative Sample	
Parameters to be Determined:	Volatile Organics	Mass Rate
Sampling or Monitoring Method:	2 random grab samples (40 mL) per test run	Mass Rate measured every 15 minutes by a Weigh Scale
Sampling Extraction/ Analysis Method(s):	GC-FID	
Sampling or Monitoring Design:		
Total No. of Samples	6	NA[1]
- Site Blanks	1	NA
- Trip Blanks	1	NA
- Lab Blanks	1/Batch[2]	NA
- Blank Spikes[3]	1/Batch	NA
- Replicates[4]	1/Batch	NA
- Matrix Spikes	1/Batch	NA
- Total No. of Samples Analyzed	12	NA

Notes:

1. Not applicable.
2. A batch consists of a maximum of 20 samples.
3. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
4. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquits. Replicate sample analysis monitors precision.

TABLE 3-3
SAMPLING AND MONITORING PLAN
FOR POHC SOLUTION (CHLOROBENZENE)

Sampling Point No.	2B	
Description:	POHC Solution (Chlorobenzene)	
No. of Test Runs:	3	
Test Objective:	Determine the DRE of the SQI	
Sampling Objective:	Collect Representative Sample	
Parameters to be Determined:	Volatile Organics	Mass Flow Rate
Sampling or Monitoring Method:	2 Random Grab Samples (40 mL) per Test Run	Mass Rate Measured Every 15 Minutes By a Weigh Scale
Sampling Extraction/ Analysis Method(s):	GC-FID	
Sampling or Monitoring Design:		
Total No. of Samples	6	NA[1]
- Site Blanks	1	NA
- Trip Blanks	1	NA
- Lab Blanks	1/Batch[2]	NA
- Blank Spikes[3]	1/Batch	NA
- Replicates[4]	1/Batch	NA
- Matrix Spikes	1/Batch	NA
- Total No. of Samples Analyzed	12	NA

Notes:

1. Not applicable.
2. A batch consists of a maximum of 20 samples.
3. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
4. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquits. Replicate sample analysis monitors precision.

Sampling Point No.	3						
Description:	Makeup Water						
No. of Test Runs:	3						
Test Objective:	Determine Chemical Characteristics and Flow Rate of Makeup Water						
Sampling Objective:	Collect Representative Sample						
Parameters to be Determined:	Volatile Organics	Semivolatile Organics	Pesticides	Dioxins/ Furans	Metals[1]	Total Halides	Volumetric Flow Rate
Sampling or Monitoring Method:	Random Grab Sample (40 mL) Per Test Run	Grab Sample **(500 mL)** Collected Every 15 Minutes. At the End of Each Test Run, Samples Will Be Composited into Appropriate Containers for Analysis. The Three Test Composites Will be Composited Again into One Trial Burn Sample for Analysis.					Flow Rate Measured Every 15 Minutes By a Flow Meter
Sampling Extraction/ Analysis Method(s):	Method 5030/ Method 8240	Method 3520/ Method 8270	Method 3520/ Methods 8080[2] and 8140[2]	Method 3520/ Methods 8290	Method 3010/ Methods 6010[3] and Method 7470[3]	Method 300	
Sampling or Monitoring Design:							
Total No. of Samples	3				1[4]		NA[5]
- Site Blanks	1	1	1	1	1	1	NA
- Trip Blanks	1	0	0	0	0	0	NA
- Lab Blanks	1/Batch[6]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	NA
- Blank Spikes[7]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	NA
- Replicates[8]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	NA
- Matrix Spikes	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	NA
- Total No. of Samples Analyzed	9						NA

NOTES:
1. Metals include antimony, arsenic barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.
2. Organochlorine pesticides - Method 8080; organophosphorus pesticides - Method 8140.
3. Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, selenium, silver, thallium, vanadium, and zinc- Method 6010; Mercury - Method 7470.
4. Three samples will be collected (one from each test). These samples will be composited into one sample for analysis. The three Individual Test Samples Will Be Archived for future use if necessary.
5. Not Applicable.
6. A batch consists of a maximum of 20 samples.
7. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
8. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquots. replicate sample analysis monitors precision.

TABLE 3-4 SAMPLING AND MONITORING PLAN FOR MAKEUP WATER

Sampling Point No.	4							
Description:	Caustic Solution							
No. of Test Runs:	3							
Test Objective:	Determine Chemical Characteristics and Flow Rate of Caustic Solution							
Sampling Objective:	Collect Representative Sample							
Parameters to be Determined:	Volatile Organics	Semivolatile Organics	Pesticides	Dioxins/ Furans	Metals[1]	Total Halides	Density	Volumetric Flow Rate
Sampling or Monitoring Method:	Random Grab Sample (40 mL) Per Test Run	Grab Sample **(500 mL)** Collected Every 15 Minutes. At the End of Each Test Run, Grab Samples Will Be Composited into Appropriate Containers. The Three Test Composites Will be Composited Again into One Trial Burn Sample for Analysis.						Flow Rate Measured Every 15 Minutes By a Flow Meter
Sampling Extraction/ Analysis Method(s):	Method 5030/ Method 8240	Method 3520/ Method 8270	Method 3520/ Methods 8080[2] and 8140[2]	Method 3520/ Methods 8290	Method 3010/ Methods 6010[3] and Method 7470[3]	Method 300	Gravimetric	
Sampling or Monitoring Design:								
Total No. of Samples	3				1[4]			NA[5]
- Site Blanks	1	1	1	1	1	1	0	NA
- Trip Blanks	1	0	0	0	0	0	0	NA
- Lab Blanks	1/Batch[6]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	NA
- Blank Spikes[7]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	0	NA
- Replicates[8]	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	NA
- Matrix Spikes	1/Batch	1/Batch	1/Batch	1/Batch	1/Batch	0	0	NA
- Total No. of Samples Analyzed	9							NA

NOTES:
1. Metals include antimony, arsenic barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.
2. Organochlorine pestisides - Method 8080; organophosphorus pesticides - Method 8140.
3. Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, selenium, silver, thallium, vanadium, and zinc- Method 6010; mercury - Method 7470.
4. Three samples will be collected (one from each test). These samples will be composited into one sample for analysis. The three individual test samples will be archived for future use if necessary.
5. Not applicable.
6. A batch consists of a maximum of 20 samples.
7. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
8. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquots. Replicate sample anlaysis monitors precision.

TABLE 3-5 SAMPLING AND MONITORING PLAN FOR CAUSTIC SOLUTION

Sampling Point No.:	5													
Description:	Brine													
No. of Test Runs:	3													
Test Objective:	Determine chemical characteristics and flow rate of brine													
Sampling Objective:	Collect a Representative Sample													
Parameters to be Determined:	Volatile Organics	Semivolatile Organics	Pesticides/ PCBs	Dioxins/ Furans	Metals[1]	Total Halides	Density	pH	Total Suspended Solids	Total Dissolved Solids	Cyanide	Fluoride	Sulfide	Volumetric Flow Rate
Sampling or Monitoring Method:	Random grab sample (40 mL) per test	Grab sample **(1,000 mL)** collected every 15 minutes. At the end of each test run, grab samples will be composited and placed into appropriate containers for analysis.												Flow Rate measured every 15 minutes by a Flow Meter
Sampling Extraction/ Analysis Method(s):	Method 5030/ Method 8240	Method 3520/ Method 8270	Method 3520/ Methods 8080[2] and 8140[2]	Method 3520/ Method 8280	Digestion Method 3010/ Methods 6010[3] and 7470[3]	Method 300	Gravimetric	Method 150.1	Method 160.2	Method 160.1	Method 335.2	Method 340.2	Method 376.2	
Sampling or Monitoring Design:														
- Total no. of samples	3	3	3	3	3	3	3	3	3	3	3	3	3	NA[4]
- Site blanks	1	1	1	1	1	1	0	1	1	1	1	1	1	NA
- Trip blanks	1	0	0	0	0	0	0	0	0	0	0	0	0	NA
- Lab blanks	1/batch[5]	1/batch	1/batch	1/batch	1/batch	1/batch	0	1	1	1	1/batch	1/batch	1/batch	NA
- Blank spikes[6]	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	0	0	0	1/batch	1/batch	1/batch	NA
- Replicates[7]	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	1	1	1/batch	1/batch	1/batch	NA
- Matrix spikes	1/batch	1/batch	1/batch	1/batch	1/batch	0	0	0	0	0	1/batch	1/batch	1/batch	NA
- Total no. of samples analyzed	9	8	8	8	8	6	3	5	6	6	8	8	8	NA

NOTES:
1. Metals include antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, zinc.
2. Organochlorine pesticides - Method 8080; Organophosphorus, pesticides - Method 8140.
3. Arsenic, antimony, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver and thallium, vanadium, zinc - Method 6010; mercury - Method 7470.
4. Not applicable.
5. A batch consists of a maximum of 20 samples.
6. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
7. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquots. Replicate sample analysis monitors precision.

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TABLE 3-6 SAMPLING AND MONITORING PLAN FOR BRINE

Sampling Point No.:	6														
Description:	Stack Gas														
No. of Test Runs:	3														
Test Objective:	Determine the DRE of the SQI														
Sampling Objective:	Collect a Representative Sample														
Parameters to be Determined:	Volatile Organics	Semivolatile Organics/ Pesticides	Dioxins/ Furans	Metals[1]	Hexavalent Chromium	Particulate	Carbon[2] Dioxide	Oxygen[2]	Sulfur[2] Dioxide	Nitrogen[2] Oxides	Carbon[2] Monoxide	Total[2] Hydro-carbons	Hydro-chloric acid[2]	Water Content	Volumetric Flow Rate
Sampling or Monitoring Method:	Method 0030	Method 0010	Method 23	Multi-metals	Hexavalent Chromium Method	Method 0050	Method 3		Method 6C	Method 7E	Method 10	Method 25A	Method 0050	Methods 1 and 2, in conjunction with Method 0010, 23, Multi-Metals, 0050, and Hexavalent Chromium	
Sampling Extraction/ Analysis Method(s):	Method 5040/8240	Method 8270/8080/ 8140[3]	Method 23			Method 5	Method 3		Method 6C	Method 7E	Method 10	Method 25A	Method 9057		
Sampling or Monitoring Design:															
- Sample size	Approx. 120 liters	>106 dscf	>106 dscf	>50 dscf	>50 dscf	≥30 dscf	60-80 L Multipoint Integrated Gas Smp		Continuous				≥50 dscf	NA[4]	NA
- Total no. of samples	6 collected/ 6 analyzed [5]	3	3	3	3	3	3	3	NA	NA	NA	NA	3	NA	NA
- Site and trip blanks [6] (solvents, resins)	1 set	1 set [7]	1 set [7]	1	1	1	0	0	NA	NA	NA	NA	1	NA	NA
- Site blanks (train blanks)	1	1	1	0	0	0	0	0	NA	NA	NA	NA	0	NA	NA
- Lab blanks	1	1	1	1	1	0	0	0	NA	NA	NA	NA	0	NA	NA
- Blank spikes	1	1	1	1	1	0	0	0	NA	NA	NA	NA	1	NA	NA
- Blank spike duplicates [8]	1	1	1	1	1	0	0	0	NA	NA	NA	NA	1	NA	NA
- Replicates [9]	0	0	0	0	0	0	6	6	NA	NA	NA	NA	2	NA	NA
- Matrix spikes	all [10]	all [11]	all [12]	1	1	0	0	0	NA	NA	NA	NA	0	NA	NA
- Total no. of samples analyzed	23	8	8	8	8	4	9	9	NA	NA	NA	NA	8	NA	NA

NOTES:

1. Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.
2. Carbon dioxide, oxygen, sulfur dioxide, nitrogen oxides, carbon monoxide, total hydrocarbons, and hydrochloric acid were monitored by CEM system. In addition, carbon dioxide, oxygen and hydrochloric acid were also monitored by integrated sampling.
3. Semivolatile organics - Method 8270; organochlorine pesticides - Method 8080; organophosphorous pesticides - Method 8140.
4. Not applicable.
5. Each sample includes a Tenax and Tenax charcoal tube pair. Each tube was analyzed individually as a means of determining compound breakthrough.
6. EPA Method 0010 and 23 site and trip blanks run only if contamination problems were found.
7. Set includes solvents, filter, XAD-2 resin, and HPLC water.
8. A blank spike, or method spike is a sample of laboratory reagent-grade water spiked with the analytes of interest that is prepared and analyzed with the associated sample batch.
9. A replicate sample is obtained by splitting a field sample into two separate analyses and performing two separate analyses on the aliquots. Replicate sample analysis monitors precision.
10. All samples spiked with Contractor Laboratory Program (CLP) Volatile Organic Analysis (VOA) surrogates.
11. All samples spiked with CLP Pesticide and Base/Neutral/Acid (BNA) surrogates.
12. All samples spiked with 37 CL-TCDD, 13CL_2-PeCDF 234, 13 CL_2-HxCDF 478, 13 CL_2-HxCDD 478 and 13 CL_2-HpCDF 789.

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TABLE 3-7 SAMPLING AND MONITORING PLAN FOR STACK GAS

Table 3-8

Sampling Equipment

Sample Point No.	Stream	Sampling Equipment
1	Liquid Waste (Basin F)	VOA samples: 40 ml glass vial. All other samples: wide-mouth glass bottle with Teflon-lined lid.*
2	POHC Spike Solution	VOA samples: 40 ml glass vial. All other samples: wide-mouth glass bottle with Teflon-lined lid.*
3	Makeup Water	VOA samples: 40 ml glass vial. All other samples: wide-mouth glass bottle with Teflon-lined lid.*
4	Caustic Solution	VOA samples: 40 ml glass vial. All other samples: wide-mouth glass bottle with Teflon-lined lid.*
5	Brine	VOA samples: 40 ml glass vial. All other samples: wide-mouth glass bottle with Teflon-lined lid.*
6	Stack Gases	Integrated sampling: EPA Method 0030 sampling train (VOST) EPA Method 0010 sampling train EPA Method 23 sampling train Multi-metals sampling train Hexavalent chromiunm sampling train EPA Method 0050 sampling train EPA Method 3 sampling train

* With the exception of VOA samples, all samples were collected every 15 minutes. At the end of each test run, samples were composited and placed into appropriate containers for analysis. At least one random grab sample was collected during each test for VOA analysis.

Table 3-9

SQI Stack Sample Identification

Sample ID Code	Sample Description
Particulate — EPA Method 0050	
RMA-TBURN-M5-RN 1-3-FHA	Front half acetone
RMA-TBURN-M5-RN 1-3-FILT	Filter
RMA-TBURN-M5-SB-ACETONE	Acetone
RMA-TBURN-M5-SB-FILT	Filter
HCL - EPA Method 0050	
RMA-TBURN-M0050-RN 1-3-H_2SO_4	Impingers containing 0.1 N sulfuric acid
RMA-TBURN-M0050-SB-H_2SO_4	0.1 N sulfuric acid solution
RMA-TBURN-M0050-SB-H_2O	H_2O
Metals - EPA Multi-Metals	
RMA-TBURN-MMTL-RN 1-3-FHN	Front half 0.1 N nitric acid
RMA-TBURN-MMTL-RN 1-3-FILT	Filter
RMA-TBURN-MMTL-RN 1-3-BHN	Back half 5% nitric acid/10% hydrogen peroxide solution
RMA-TBURN-MMTL-RN 1-3-IMP4	Impinger 4 condensate catch
RMA-TBURN-MMTL-RN 1-3-$KMNO_4$	Potasium permanganate/sulfuric acid solution
RMA-TBURN-MMTL-RN 1-3-HCl/H_2O	Hydrochloric acid/distilled water
RMA-TBURN-MMTL-SB-NITRIC	0.1 N nitric acid solution
RMA-TBURN-MMTL-SB-FILTER	Filter
RMA-TBURN-MMTL-SB-NITRIC/H_2O_2	5% nitric acid/10% peroxide solution
RMA-TBURN-MMTL-SB-$KMNO_4$	4% potasium permanganate/10% sulfuric acid solution
RMA-TBURN-MMTL-SB-HCl/H_2O	8 N hydrochloric acid
RMA-TBURN-MMTL-AUDIT-L341	Metals audit sample
RMA-TBURN-MMTL-AUDIT-H341	Metals audit sample
Semivolatiles - EPA Method 0010	
RMA-TBURN-M0010-RN 1-3-FHS	Front half solvent (50% methanol/50% methylene chloride)
RMA-TBURN-M0010-RN 1-3-XAD	XAD resin trap
RMA-TBURN-M0010-RN 1-3-FILT	Filter
RMA-TBURN-M0010-RN 1-3-COND	Condensate and distilled water rinse
RMA-TBURN-M0010-RN 1-3-BHS	Back half solvent (50% methanol/50% methylene chloride)
RMA-TBURN-M0010-BT-SOL	Front-half solvent (50% methanol/50% methylene chloride)
RMA-TBURN-M0010-BT-FILT	Filter
RMA-TBURN-M0010-BT-XAD	XAD resin trap

Table 3-9

SQI Stack Sample Identification
(Continued)

Sample ID Code	Sample Description
RMA-TBURN-M0010-BT-COND	Condensate and distilled water rinse
RMA-TBURN-M0010-BT-BHS	Back half solvent (50% methanol/50% methylene chloride)
RMA-TBURN-M0010-SB-SOL	Solvent (50% methanol/50% methylene chloride)
RMA-TBURN-M0010-SB-FILT	Filter
RMA-TBURN-M0010-SB-XAD	XAD resin trap
RMA-TBURN-M0010-SB-WATER	HPLC grade distilled water
PCDD/PCDF - EPA Method 23	
RMA-TBURN-M23-RN 1-3-FHS	Front half solvent (50% acetone/50% methylene chloride)
RMA-TBURN-M23-RN 1-3-FILT	Filter
RMA-TBURN-M23-RN 1-3-XAD	XAD resin trap
RMA-TBURN-M23-RN 1-3-COND	Condensate and distilled water rinse
RMA-TBURN-M23-RN 1-3-BHS	Back half solvent (50% acetone/50% methylene chloride)
RMA-TBURN-M23-RN 1-3-TOL	Toluene (QA/QC rinse)
RMA-TBURN-M23-BT-SOL	Front half solvent (50% acetone/50% methylene chloride)
RMA-TBURN-M23-BT-FILT	Filter
RMA-TBURN-M23-BT-XAD	XAD resin trap
RMA-TBURN-M23-BT-COND	Condensate and distilled water rinse
RMA-TBURN-M23-BT-BHS	Back half solvent (50% acetone/50% methylene chloride)
RMA-TBURN-M23-BT-TOL	Toluene (QA/QC rinse)
RMA-TBURN-M23-SB-SOL	Solvent (50% acetone/50% methylene chloride)
RMA-TBURN-M23-SB-XAD	XAD resin trap
RMA-TBURN-M23-SB-WATER	HPLC distilled water
RMA-TBURN-M23-SB-FILT	Filter
RMA-TBURN-M23-SB-TOL	Toluene
RMA-TBURN-M23-AUDIT-1156	PCDD/PCDF audit
RMA-TBURN-M23-AUDIT-8863	PCDD/PCDF audit
RMA-TBURN-M23-AUDIT-NO. 3	PCDD/PCDF audit
Volatiles - EPA Method 0030	
RMA-TBURN-M0030-RN 1-3-TP1	Tube Pair 1
RMA-TBURN-M0030-RN 1-3-TP2	Tube Pair 2
RMA-TBURN-M0030-RN 1-3-TP3	Tube Pair 3

Table 3-9

SQI Stack Sample Identification
(Continued)

Sample ID Code	Sample Description
RMA-TBURN-M0030-RN 1-3-TP4	Tube Pair 4
RMA-TBURN-M0030-RN 1-3-TP5	Tube Pair 5
RMA-TBURN-M0030-RN 1-3-TP6	Tube Pair 6
RMA-TBURN-M0030-RN 1-3-COND1	Condensate 1
RMA-TBURN-M0030-RN 1-3-COND2	Condensate 2
RMA-TBURN-M0030-RN 1-3-COND3	Condensate 3
RMA-TBURN-M0030-RN 1-3-COND4	Condensate 4
RMA-TBURN-M0030-SB-TP1	Tube Pair 1
RMA-TBURN-M0030-SB-COND1	Condensate 1
RMA-TBURN-M0030-BT-TP1	Tube Pair 1
RMA-TBURN-M0030-BT-COND1	Condensate 1
RMA-TBURN-M0030-AUDIT 1-TP1	VOST audit (cylinder 567)
RMA-TBURN-M0030-AUDIT 1-TP2	VOST audit (cylinder 567)
RMA-TBURN-M0030-AUDIT 1-TP3	VOST audit (cylinder 567)
RMA-TBURN-M0030-AUDIT 1-TP4	VOST audit (cylinder 567)
RMA-TBURN-M0030-AUDIT 2-TP1	VOST audit (cylinger 568)
RMA-TBURN-M0030-AUDIT 2-TP2	VOST audit (cylinger 568)
RMA-TBURN-M0030-AUDIT 2-TP3	VOST audit (cylinger 568)
RMA-TBURN-M0030-AUDIT 2-TP4	VOST audit (cylinger 568)
Hexavalent Chromium - EPA Cr^{+6} Method	
RMA-TBURN-Cr^{+6}-RN 1-3-KOH	Potasium hydroxide solution
RMA-TBURN-Cr^{+6}-SB-KOH	Potasium hydroxide solution
RMA-TBURN-Cr^{+6}-SB-H_2O	Distilled water

SB = Site/reagent blank samples
BT = Blank train samples
RN = Test run number

Table 3-10

Sampling Procedures

Sample Stream	EPA Reference Method(s)[a]	Measurement Technique	Sampling Frequency or Duration
Liquid Waste (Basin F)	S004	NA[b]	15 min
POHC Spike Solution	S004	NA	15 min
Makeup Water	S004	NA	15 min
Caustic Solution	S004	NA	15 min
Brine	S004	NA	15 min
Stack Gas Integrated Sampling Volatile Organics	Method 0030[c] (VOST)	Single-point, integrated constant rate	2 hrs
Semivolatile Organics, Pesticides, Water Vapor	Method 0010	Multipoint, integrated isokinetic, ± 10%	4 hrs
Dioxins/Furans, Water Vapor	Method 23	Multipoint, integrated isokinetic, ± 10%	4 hrs
Metals, Water Vapor	Multi-metals[d]	Multipoint, integrated isokinetic, ± 10%	2 hrs
Hexavalent Chromium	Hexavalent chromium	Multipoint, integrated isokinetic, ± 10%	2 hrs
HCl/Particulate	Method 0050	Multipoint, integrated isokinetic, ± 10%	2 hrs
CO_2 and O_2	Method 3	Multipoint, integrated isokinetic, ± 10%	2 and 4 hrs
Water Content, Volumetric Flowrate	Methods 1 and 2 (in conjunction with Methods 0050, 0010, 23, multi-metals and hexavalent chromium methods)		2 and 4 hrs

Table 3-10

Sampling Procedures
(Continued)

Sample Stream	EPA Reference Method(s)[a]	Measurement Technique	Sampling Frequency or Duration
Continuous Emissions Monitoring			
Sulfur Dioxide	Method 6C	CEM System	Continuous
CO_2 and O_2	Method 3A	CEM System	Continuous
Carbon Monoxide	Method 10	CEM System	Continuous
Nitrogen Oxides	Method 7E	CEM System	Continuous
Total Hydrocarbons	Method 25A	CEM System	Continuous
Hydrochloric Acid	NRM[e]	CEM System	Continuous

[a]EPA test procedures as specified in 40 CFR 60, Appendix A - Reference Method 5.
[b]NA - Not applicable.
[c]Sampling and Analytical Methodologies for Addition to Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, EPA SW-846, 3rd Edition, 1984, will be used to quantify the principal organic hazardous constituent (POHC) and volatile products of incomplete combustion (PICs).
[d]Multi-metals - Methodology for the Determination of Metals Emissions in Exhaust Gases from Hazardous Waste Incineration and Similar Combustion Processes, EPA/530-SW-91-010.
[e]NRM: No reference method.

SECTION 4
ANALYTICAL PROCEDURES

Except for the dioxin/furan and hexavalent chromium analyses of the stack gas and liquid feed samples, all analyses were conducted by the WESTON Analytics Division laboratories located in Lionville, PA. WESTON's Lionville laboratory has participated in the EPA Contract Laboratory Program (CLP) to provide organic and inorganic target compound list (TCL) analyses. WESTON routinely analyzes samples and prepares litigation-quality data packages in accordance with EPA protocols for volatile and semivolatile organics, organochlorine pesticides/PCBs, metals, and cyanide in soil and water matrices.

Dioxin/furan analysis of the SQI stack samples and liquid feed samples by EPA Method 23 procedures was performed by Triangle Laboratories, located in Durham, NC. The hexavalent chromium analysis of the stack samples was performed by Research Triangle Institute, located in Research Triangle Park, NC.

4.1 ANALYTICAL METHODS

A summary of the extraction and analytical methods employed during the Trial Burn test is provided in Table 4-1. A comparison of WESTON standard operation procedures (SOPs) and EPA references is provided in Table 4-2.

4.2 ANALYTES

The list of analytes within the following analytical groups are presented in Tables 4-3 through 4-8:

- Volatile Organic Compounds (Table 4-3).
- Semivolatile Organic Compounds (Table 4-4).
- Pesticides/PCBs (Table 4-5).
- Dioxins/Furans (Table 4-6).
- Metals (Table 4-7).
- Total Halides (Table 4-8).

Table 4-1

Summary of Extraction and Analytical Methods

Sample Stream	EPA Reference Extraction Method	EPA Reference Analytical Method
LIQUID WASTE (LW)/BRINE (BR)		
Volatile Organics	5030	8240
Semivolatile Organics	3510/3520	8270
Pesticides • Organochlorine • Organophosphorous	 3510/3520 3510/3520	 8080 8140
Dioxins/Furans	LW - 8290 Brine - 8280	LW - 8290 Brine - 8280
Metals	Digestion Methods 3010/3020	Antimony - 6010 Arsenic - 6010(7060) Barium - 6010 Beryllium - 6010 Cadmium - 6010 Copper - 6010 Lead - 6010(7421) Mercury - 7470 Nickel - 6010 Selenium - 6010(7740) Silver - 6010 Thallium - 6010(7841) Vanadium - 6010 Zinc - 6010
Sulfur Content (LW Only)	ASTM D129	Method 300.0
Total Halides	ASTM D808-81	Method 300.0
Density	Not Applicable	ASTM D1429-76
Heating Value (LW Only)	Not Applicable	ASTM D240
Ash Content (LW Only)	Not Applicable	Method 160.3
pH	Not Applicable	Method 150.1
Water Content (LW Only)	Not Applicable	Method 160
Total Suspended Solids	Not Applicable	Method 160.2
Total Dissolved Solids	Not Applicable	Method 160.1
Cyanide (Brine Only)	Not Applicable	Method 335.2
Fluoride (Brine Only)	Not Applicable	Method 340.2
Sulfide (Brine Only)	Not Applicable	Method 376.2

Table 4-1

Summary of Extraction and Analytical Methods (Continued)

Sample Stream	EPA Reference Extraction Method	EPA Reference Analytical Method
POHC SOLUTIONS		
Volatile Organics	Not Applicable	8100
MAKEUP WATER (MW)/CAUSTIC SOLUTION (CS)		
Volatile Organics	5030	8240
Semivolatile Organics	3510/3520	8270
Pesticides • Organochlorine • Organophosphorous	 3510/3520 3510/3520	 8080 8140
Dioxin/Furan	8290	8290
Metals	Digestion Methods 3010/3020	Antimony - 6010 Arsenic - 6010(7060) Barium - 6010 Beryllium - 6010 Cadmium - 6010 Copper - 6010 Lead - 6010(7421) Mercury - 7470 Nickel - 6010 Selenium - 6010(7740) Silver - 6010 Thallium - 6010(7841) Vanadium - 6010 Zinc - 6010
Total Halides	ASTM D808-81	Method 300
Density	Not Applicable	ASTM D1429-76
STACK GAS		
Volatile Organics	5040	8240
Semivolatile Organics	3540/3550	8270
Pesticides • Organochlorine • Organophosphorous	 3540/3550 3540/3550	 8080 8140
Dioxins/Furans	Method 23	8290

Table 4-1

Summary of Extraction and Analytical Methods (Continued)

Sample Stream	EPA Reference Extraction Method	EPA Reference Analytical Method
Metals	Digestion Methods 3010/3020	Antimony - 6010 Arsenic - 6010(7060) Barium - 6010 Beryllium - 6010 Cadmium - 6010 Copper - 6010 Lead - 6010(7421) Mercury - 7470 Nickel - 6010 Selenium - 6010(7740) Silver - 6010 Thallium - 6010(7841) Vanadium - 6010 Zinc - 6010
Hexavalent Chromium	Not Applicable	7196
Particulate	Not Applicable	Method 5
Carbon Dioxide/Oxygen	Not Applicable	Method 3 & 3A
Sulfur Dioxide	Not Applicable	Method 6C
Nitrogen Oxides	Not Applicable	Method 7E
Carbon Monoxide	Not Applicable	Method 10
Total Hydrocarbons	Not Applicable	Method 25A
Hydrochloric Acid	Not Applicable	9057

Table 4-2

Comparison of EPA Reference Methods to WESTON SOPs

Analysis Method	EPA Reference	WESTON SOP
Metals Digestion	SW 846 3010/3020	OP21-15-3020.1
Metals by ICP	SW 846 6010	OP21-15-0200.7
Metals by GFAA or ICP	SW 846 7000 Series	OP21-15-0200.2
Heat of Combustion	ASTM D240	OP21-15-0051
Sulfur Content	ASTM D129	NA
Percent Ash	209F	OP21-15-0160.6
Percent Moisture	209F	OP21-15-0160.6
Multi-metals	SW 846 7000 Series	SW 846 7000 Series
Volatile Organics (stack gas)	5040	OP21-16-5040.1
Volatile Organics (liquids)	8240	OP21-16-8240.3
Semivolatile Organics	8270	OP21-16-8270.1
Dioxin/Furan	8280	OP21-16-8280.1
PCBs (stack gas)	8080	OP21-16-8080.1
PCBs (liquids)	8080	OP21-16-8080.1
Pesticides	8080/8140	OP21-16-8080.1/8140.1
Total Halides	300.0	OP21-15-0300.0
Total Suspended Solids	160.2	OP21-15-0160.2
Total Dissolved Solids	160.1	OP21-15-0160.1

SOP Standard Operating Procedure
NA Not Available (EPA reference method used for analysis)
ICP Inductively Coupled Plasma
GFAA Graphite Furnace Atomic Absorption

Table 4-3

Volatile Organic Compounds (Method 8240)

Chloromethane	Trichloroethene
Bromomethane	Dibromochloromethane
Vinyl Chloride	1,1,2-Trichloroethane
Chloroethane	Benzene
Methylene Chloride	Trans-1,3-Dichloropropene
Acetone **(not included in VOST)**	Bromoform
Carbon Disulfide	Trans-1,3-Dichloropropene
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone **(not included in VOST)**
Chloroform	Tetrachloroethene
1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
2-Butanone **(not included in VOST)**	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethylbenzene
Vinyl Acetate **(not included in VOST)**	Styrene
Bromodichloromethane	Xylene (total)
1,2-Dichloropropane	**Dimethyldisulfide (TIC only*)**
cis-1,3-Dichloropropene	

*TIC: Tentatively Identified Compound.

Table 4-4

Semivolatile Organic Compounds (Method 8270)

Phenol	3-Nitroaniline
bis(2-Chloroethyl)ether	Acenaphthene
2-Chlorophenol	2,4-Dinitrophenol
1,3-Dichlorobenzene	4-Nitrophenol
1,4-Dichlorobenzene	Dibenzofuran
Benzyl alcohol	2,4-Dinitrotoluene
1,2-Dichlorobenzene	Diethylphthalate
2-Methylphenol	4-Chlorophenyl-phenylether
bis(2-Chloroisopropyl)ether	Fluorene
4-Methylphenol	4-Nitroaniline
N-Nitroso-Di-n-propylamine	4,6-Dinitro-2-methylphenol
Hexachloroethane	N-Nitrosodiphenylamine (1)
Nitrobenzene	4-Bromophenyl-phenylether
Isophorone	Hexachlorobenzene
2-Nitrophenol	Pentachlorophenol
2,4-Dimethylphenol	Phenanthrene
Benzoic acid	Anthracene
bis(2-Chloroethoxy)methane	Di-n-Butylphthalate
2,4-Dichlorophenol	Fluoranthene
1,2,4-Trichlorobenzene	Pyrene
Naphthalene	Butylbenzylphthalate
4-Chloroaniline	3,3'-Dichlorobenzidine
Hexachlorobutadiene	Benzo(a)anthracene
4-Chloro-3-methylphenol	Chrysene
2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate
Hexachlorocyclopentadiene	Di-n-Octyl phthalate
2,4,6-Trichlorophenol	Benzo(b)fluoranthene
2,4,5-Trichlorophenol	Benzo(k)fluoranthene
2-Chloronaphthalene	Benzo(a)pyrene
2-Nitroaniline	Indeno(1,2,3-cd)pyrene
Dimentylphthalate	Dibenzo(a,h)anthracene
Acenaphthylene	Benzo(g,h,i)perylene
2,6-Dinitrotoluene	**4,4-Dichlorobiphenyl (TIC only*)**
Quinoline (TIC only*)	**Pentachlorobenzene (TIC only*)**
Carbazole (TIC only*)	

*Tentatively identified compound.

Table 4-5

Pesticides/PCBs

Organochlorine Pesticides/PCBs (Method 8080)	Organophosphorous Pesticides (Method 8140)
Alpha-BHC	Azinphos methyl
Beta-BHC	Bolstar
Delta-BHC	Chlorpyrifos
Gamma-BHC (Lindane)	Coumaphos
Heptachlor	Demeton-O
Aldrin	Demeton-S
Heptachlor epoxide	Diazinon
Endosulfan I	Dichlorvos
Dieldrin	Disulfoton
4,4'-DDE	Ethoprop
Endrin	Fensulfothion
Isodrin	Fenthion
Endosulfan II	**Malathion**
4,4'-DDD	Merphos
Endosulfan sulfate	Mevinphos
4,4'-DDT	Naled
Methoxychlor	**Parathion ethyl**
Endrin ketone	Parathion methyl
Alpha-chlordane	Phorate
Gamma-chlordane	Ronnel
Toxaphene	Stirophos
Arochlor-1016	**Supona**
Arochlor-1221	Tokuthion
Arochlor-1232	Trichloronate
Arochlor-1242	
Arochlor-1248	
Arochlor-1254	
Arochlor-1260	

Table 4-6

Dioxins/Furans

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
2,3,7,8-Tetrachlordibenzofuran (TCDF)
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)

Table 4-7

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

Table 4-8

Total Halides
(Method 300)

Fluoride
Chloride
Bromide
Iodide

SECTION 5
TEST RESULTS

This section contains a summary of test results for the stack emissions and process influent and effluent streams sampled during the Trial Burn program. The raw sampling data, calculations, and emission tables prepared by WESTON are provided in Appendix B of this report. The analytical data and results tables prepared by WESTON Lionville Analytical Laboratories are provided in Appendix C of this report. Pertinent data from the associated tables in Appendices B and C of this report have been summarized and are provided in the following summary tables:

- Table 5-1: Particulate/HCl Emission Results
- Table 5-2: Volatile Organic Compounds Emission Results
- Table 5-3: Semivolatile Organic Compounds and Pesticides Emission Results
- Table 5-4: Dioxins/Furans Emission Results
- Table 5-5: Metals Emission Results
- Table 5-6: Hexavalent Chromium Emission Results
- Table 5-7: CO, CO_2, O_2, SO_2, NO_x, THC 2nd HCl Emission Results
- Table 5-8: Summary of Analytical Results for Basin F Waste Feed
- Table 5-9: Summary of Analytical Results for POHCs
- Table 5-10: Summary of Analytical Results for Makeup Water
- Table 5-11: Summary of Analytical Results for Caustic Solution
- Table 5-12: Summary of Analytical Results for Brine

For convenience of the reader, Tables 5-1 through 5-12 are provided at the end of Section 5.

5.1 TREATMENT OF NON-DETECTS, VALUES OUTSIDE OF THE CALIBRATION RANGE AND BLANKS

Treatment of non-detects (analytical results for which the concentration of the species of interest is below the detection limit of the method) and blank values is of critical importance to this program because detection levels and blank concentrations are often on the same order of magnitude as sample values. This section describes how blank and non-detect values are presented in the Trial Burn Report.

5.1.1 Non-Detects

The following discussion explains how averages and reported emission values were calculated for all species given various combinations of detected and non-detected concentrations.

- All concentrations detected. The arithmetic average of the individual values is taken. No special techniques are required.
- All concentrations below the detection limit. For individual test runs or species, the analytical results will be reported as "ND". For species where all three test runs of the Trial Burn are below the detection limit, the average is reported in the Trial Burn data as "ND".
- Some concentrations are detected and some are non-detects. As an approximation, half of the detection limit for nondetect values and the actual value for detects will be used to determine averages. As an example, an average for three test runs with results 10, 8 and ND<(6) would be 7. The only exception to this rule occurs when the average is less than the highest detection limit of the non-detected values. In this case, the average is reported as ND<(highest detection limit). For example, 5, ND<(4) and ND<(3) would be reported as ND<(4).

This approach was also used to obtain test train totals which required analyses of separate fractions for each individual run. Specifically, the volatiles, semivolatiles (including

pesticides) and metals test train totals for each run were obtained by addition of test train fractions which were analyzed separately.

Fractions from the volatile test train included separate analyses of the tenax and tenax/charcoal tubes for each sample period. A total of six tube pairs was collected for each of the three tests. Separate analyses was conducted on the filterable and gaseous test train components for both the semivolatiles and metals test trains.

5.1.2 Values Outside of the Calibration Range

It is possible that the reported lab data will be outside the calibration range of the instrument. Data reported below the lower detection limit will be flagged with the qualifier "J". Data with the "J" flag will have been tentatively identified and tentatively quantified. Data reported above the upper detection limit will be flagged with the qualifier "E". Data with the "E" flag will have been positively identified and tentatively quantified. Data with either qualifier will be estimated. WESTON considered "J" and "E" values to be quantitatively representative when calculating averages. Neither flag causes a value to be weighted more or less important.

When a "J" or "E" qualifier was assigned to a test train fraction and added to either a detection limit or a detected value, the test train total was also assigned the "J" or "E" qualifier.

5.1.3 Blank Values

When a method does not specify how a sample will be blank corrected, WESTON subtracts appropriate blank train values. Laboratory and site/reagent blanks were analyzed and the results evaluated for identification of contamination. In no case were the blank corrected values reported below the method detection limit. If a sample compound was corrected by the blank train, the data was flagged by a qualifier "B". If the value is blank train corrected

to the detection limit, it will be reported as ND < (highest detection limit) B. In cases where a blank value exceeds the level found in a sample, the sample value will be corrected to the detection limit ND < (highest detection limit)BC. The "BC" qualifier signifies that the compound was detected in higher concentrations in the blank than in the sample.

Blank trains were setup, recovered and analyzed for the volatiles, semivolatiles (including pesticides) and dioxins/furans. The quantified blank train values were used to blank correct the measured test values. Site/reagent blanks were collected and analyzed for the purpose of blank correcting the measured values obtained for the particulates, hydrochloric acid and metals test trains. The metals blank adjustments adhered to the criteria outlined in the multi-metals test procedure.

5.2 STACK EMISSIONS

Summary tables of the analytical results for stack emissions are presented in this subsection. For convenience, Tables 5-1 through 5-7 are provided at the end of Section 5. The raw analytical data are provided in Appendix B of this report.

5.2.1 Particulate/HCl

During the Trial Burn test program, stack emissions were sampled using EPA Method 0050. The filterable particulate analysis was performed using EPA Method 5; the HCl determination was conducted using Method 9057 (ion chromatography) procedures. Analytical results are presented in Table 5-1. The regulatory criteria for particulate and HCl emissions are as follows:

- Particulate emissions shall be less than 0.08 gr/dscf corrected to 7% O_2 and less than 0.10 gr/dscf corrected to 12% CO_2, whichever is more stringent.
- Hydrogen chloride emissions shall be less than 4 lb/hr or greater than 99% removal efficiency.

As shown in Table 5-1, particulate emissions for test runs 1, 2, and 3 were 0.0194, 0.0238 and 0.0209 gr/dscf (corrected to 7% O_2) and 0.0290, 0.0360 and 0.0311 gr/dscf (corrected to 12% CO_2), respectively. HCl emissions for test runs 1, 2 and 3 were 0.1273, 0.3103 and 0.2497 lb/hr, respectively. All of the reported values are well below the regulatory criteria defined above.

5.2.2 Volatile Organic Compounds

The results of the Method 0030 sampling train for the POHC compounds are provided below.

Test Data			
Test Run No.	One	Two	Three
Test Date	6/10/93	6/11/93	6/12/93
Test Time	0808-1109	0738-1047	0830-1124
Average stack gas volumetric flow (dscf/min)	7775	7900	7875
Emission Results			
Carbon Tetrachloride (lb/hr)	ND < (8.26×10^{-5})	8.98×10^{-5}	ND < (8.92×10^{-5})
Chlorobenzene (lb/hr)	3.20×10^{-5}	ND < (8.58×10^{-5})	ND < (8.71×10^{-5})
DRE Test Results			
Carbon Tetrachloride			
Feed rate (lb/hr)	6.90	8.66	8.79
DRE (%)	>99.9988	99.9990	>99.9990
Chlorobenzene			
Feed rate (lb/hr)	8.66	8.98	8.79
DRE (%)	99.9996	>99.9990	>99.9990

The laboratory analysis for the POHC compounds indicate a destruction and removal efficiency (DRE) greater than the regulatory limit of 99.99%. The DRE is calculated as follows:

$$DRE = \frac{W_{in} - W_{out}}{W_{in}} \times 100$$

where:

W_{in} = POHC mass rate in
W_{out} = POHC mass rate out (emissions)

A DRE >99.9990% was demonstrated for monochlorobenzene, and >99.9988% was demonstrated for carbon tetrachloride.

A summary of the volatile organic emissions in the stack gas is provided in Table 5-2. Products of incomplete combustion (PICs) were identified in the stack gas. Only 9 compounds have averages greater than the detection limit value, and the total PIC emission concentration averaged less than 59 ppb/v. These compounds are identical to those found in the previous mini-burn emission results, summarized in Appendix A.3.1 and A.3.2.

5.2.3 Semivolatile Organic Compounds and Pesticides

The results of the Method 0010 sampling train for semivolatile organic compounds and pesticides are provided in Table 5-3. Of the 69 semivolatile organic compounds listed, only 4 compounds have values greater than the detection limit value: diethylphthalate, di-n-butylphthalate, butylbenzylpthalate and bis(2-ethylhexyl)phthalate. These compounds were also found in the previous mini-burn emission results. Two of these compounds appear to be the result of sample contamination since they were detected in the blank trains.

Twenty-eight organochlorine pesticide/PCB compounds (Pest/PCB) and 25 organo-phosphorous pesticide compounds (OP Pest) were also analyzed and reported in Table 5-3. Only 1 Pest/PCB compound was detected in the stack gas of run #1 - heptachlor epoxide. The emission value averaged 9.92E-07 lb/hr.

5.2.4 Dioxin/Furans

Stack sampling using a Method 23 sampling train was performed in order to determine emission levels of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs). The summary results of the dioxin/furan analysis are provided in Table 5-4. There was no detectable concentration of 2,3,7,8-TCDD in the stack gas. Detected isomers of total PCDD averaged 1 ppq/v and isomers of total PCDF averaged 7 ppq/v. Total PCDD and PCDF for each test averaged less than 0.018 ng/dscm and 0.091 ng/dscm, respectively. The dioxin/furan toxic equivalency factor (TEF) was equal to 1.74E-11 lb/hr.

5.2.5 Metals

Stack sampling using the multi-metals sampling train was performed to determine the emission level of 15 critical metals defined in the Trial Burn Plan. The summary results of the multi-metals analysis are provided in Table 5-5. The mass rate emissions are comparable to those reported for the second mini-burn (reference Appendix A.3.2).

5.2.6 Hexavalent Chromium

Stack sampling for hexavalent chromium was performed; results are provided in Table 5-6. The mass rate emission averaged 6.37E-06 lb/hr (or 0.226 ug/dscm).

5.2.7 Continuous Emissions Monitoring

An extractive-type continuous emissions monitoring system was used to record the stack emissions for carbon monoxide (CO) and oxygen (O_2). The average readings for each test run are presented in Table 5-7. The CO hourly rolling average over the three test runs averaged 51.5 ppm, while excess oxygen averaged 3.50%.

5.3 SYSTEM INFLUENT AND EFFLUENT STREAMS

Summary tables of the analytical results for system influent and effluent streams (excluding stack samples) are presented in this subsection. Only detectable concentrations are presented in the summary tables. None of the reported concentrations are blank corrected. For convenience, Tables 5-8 through 5-12 are provided at the end of Section 5. The raw analytical data are contained in Appendix C of this report, which provides the detection limits for parameters not present in measurable quantities.

5.3.1 System Influent Streams — Waste Feed, POHC, Makeup Water and Caustic

5.3.1.1 Waste Feed

Basin F waste feed was sampled and analyzed for volatile organics, semivolatile organics, pesticides, dioxins/furans, metals, sulfur, halides, density, heating value, ash content, pH, water content, total dissolved solids and total suspended solids per the monitoring plan defined in Table 3-1. Individual 1,000-mL samples were collected every 15 minutes during the test runs, and composited at the end of the day. Additionally, two 40-mL random grab samples were collected per run for volatile organic analysis. As stated in Section 2.3.1, the grab volume was increased from 100-mL to 1,000-mL to ensure a sufficient sample volume was collected for analyses and splits.

A summary of the analytical results for the waste feed is provided in Table 5-8. Analytes that are not listed in the summary table were reported as non-detects. The complete list

of analytes within each analytical group is presented in Tables 4-3 through 4-8. It should be noted that Method D240 for heating value analysis does not provide for the addition of an additive, and since the samples did not ignite, a btu value is not reported. The average heating value of the Basin F waste was determined to be 1,356 btu/lb using Method D2015 during the second mini-burn test.

5.3.1.2 POHCs

The two principal organic hazardous constituents (POHCs) which were injected into the Basin F feed for the Trial Burn were carbon tetrachloride and monochlorobenzene. The POHCs were selected in accordance with the EPA document Guidance on Setting Permit Conditions and Reporting Trial Burn Results, Volume II, Hazardous Waste Incineration Guidance Series, January, 1989. The selection of these POHCs was made to cover aromatic and aliphatic types of compounds.

Since both of these compounds were purchased pure, in 55-gallon drums, the laboratory analysis was limited to volatile organics. Purity certificates for each POHC compound are attached in Appendix A.2.4. Two random grab samples were taken in 40-mL vials at the beginning and end of each test run. The analytical results for the POHCs is provided in Table 5-9. DRE calculations are based upon the assumption that the POHCs were 100% pure, and are not based upon the analytical recovery results.

A significant concentration of chlorobenzene was detected in the carbon tetrachloride analysis for grab sample 2 in run #2. This contamination has unknown origin, and may possibly be due to improper sampling techniques. In a worst case calculation for DRE, assuming an average POHC purity of only 93% (based upon the recoveries in Table 5-9), a DRE >99.9987 was still demonstrated (reference calculations in Appendix B — Volume III).

5.3.1.3 Makeup Water

The makeup water was sampled and analyzed for volatile organics, semivolatile organics, pesticides, dioxins/furans, metals, and halides per the monitoring plan defined in Table 3-4. Individual 500-mL samples were collected every 15 minutes during the test runs, and composited at the end of the day. Additionally, two 40-mL random grab samples were collected per run for volatile organic analysis. As stated in Section 2.3.1, the grab volume was increased from 100-mL to 500-mL to ensure a sufficient sample volume was collected for analysis and splits. A summary of the analytical results for the makeup water is provided in Table 5-10.

5.3.1.4 Caustic Solution

The caustic solution was sampled and analyzed for volatile organics, semivolatile organics, pesticides, dioxins/furans, metals, halides and density per the monitoring plan defined in Table 3-5. Individual 500-mL samples were collected every 15 minutes during the test runs, and composited at the end of the day. Additionally, two 40-mL random grab samples were collected per run for volatile organic analysis. As stated in Section 2.3.1, the grab volume was increased from 100-mL to 500-mL to ensure a sufficient sample volume was collected for analysis and splits. A summary of the analytical results for the caustic solution is provided in Table 5-11.

5.3.2 System Effluent Streams — Brine

Brine was sampled and analyzed for volatile organics, semivolatile organics, pesticides, PCBs, dioxins/furans, metals, halides, density, pH, total suspended solids, total dissolved solids, cyanide, fluoride and sulfide per the monitoring plan defined in Table 3-6. Individual 1,000-mL samples were collected every 15 minutes during the test runs, and composited at the end of the day. Additionally, two 40-mL random grab samples were collected per run for volatile organic analysis. As stated in Section 2.3.1, the grab volume was increased from

100-mL to 1,000-mL to ensure a sufficient sample volume was collected for analysis and splits. A summary of the analytical results for the brine is provided in Table 5-12. There were no reported values for volatile organics, semivolatile organics, pesticides or dioxins/ furans above the detection limit.

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TRIAL BURN TEST PROGRAM
TABLE 5-1
SUMMARY OF PARTICULATE AND HCL TEST DATA AND TEST RESULTS

TEST DATA			
Test run number	1	2	3
Test location		INCINERATOR STACK	
Test date	06-10-93	06-11-93	06-12-93
Test time period	0745-1041	0843-1341	0756-1047
SAMPLING DATA			
Sampling duration, min.	120.0	120.0	120.0
Nozzle diameter, in.	0.363	0.363	0.363
Cross sectional nozzle area, sq.ft.	0.000719	0.000719	0.000719
Barometric pressure, in. Hg	24.79	24.57	24.62
Avg. orifice press. diff., in H_2O	1.60	1.66	1.56
Avg. dry gas meter temp., deg F	81	93	86
Avg. abs. dry gas meter temp., deg. R	541	553	546
Total liquid collected by train, ml	2566.0	2543.0	2473.0
Std. vol. of H2O vapor coll., cu.ft.	120.8	119.7	116.4
Dry gas meter calibration factor	0.9923	0.9923	0.9923
Sample vol. at meter cond., dcf	87.391	89.933	87.209
Sample vol. at std. cond., dscf (1)	70.385	70.285	69.169
Percent of isokinetic sampling	100.3	99.4	99.2
GAS STREAM COMPOSITION DATA			
CO_2, % by volume, dry basis	10.1	9.9	10.1
O_2, % by volume, dry basis	3.4	3.5	3.6
CO, % by volume, dry basis	0.0	0.0	0.0
N_2, % by volume, dry basis	86.5	86.6	86.4
Molecular wt. of dry gas, lb/lb mole	29.75	29.73	29.75
H_2O vapor in gas stream, prop. by vol.	0.632	0.630	0.627
Mole fraction of dry gas	0.368	0.370	0.373
Molecular wt. of wet gas, lb/lb mole	22.3	22.3	22.4
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA			
Static pressure, in. H_2O	-0.18	-0.19	-0.17
Static pressure, in. Hg	-0.013	-0.014	-0.013
Absolute pressure, in. Hg	24.78	24.56	24.61
Avg. temperature, deg. F	183	183	183
Avg. absolute temperature, deg.R	643	643	643
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	12	12
Avg. gas stream velocity, ft./sec.	54.2	54.8	53.6
Stack/duct cross sectional area, sq.ft.	9.62	9.62	9.62
Avg. gas stream volumetric flow, wacf/min.	31300	31700	30900
Avg. gas stream volumetric flow, dscf/min.	7800	7900	7800
LABORATORY REPORT			
Particulate			
Front half acetone rinse, g	0.0184	0.0220	0.0229
Filter, g	0.0931	0.1137	0.0939
Total catch, g	0.1115	0.1357	0.1168
HCl			
Total mg HCl	8.65	20.91	16.79
PARTICULATE EMISSIONS			
Concentration, gr/dscf	0.0244	0.0298	0.0261
Concentration, gr/dscf @7% O_2	0.0194	0.0238	0.0209
Concentration, gr/dscf @12% CO_2	0.0290	0.0360	0.0311
Mass rate, lbs/hr	1.6408	2.0140	1.7374
HCl EMISSIONS			
Concentration, lbs/dscf	2.71E-07	6.56E-07	5.35E-07
Concentration, ppm/v	2.8650	6.9336	5.6571
Mass rate, lbs/hr	0.1273	0.3103	0.2497
POHC Chloride Feed Rate, lb/hr (as HCL)(2)	9.35	11.13	11.11
HCL Removal Efficiency, %	> 98.64	> 97.21	> 97.75

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg)
(2) Inlet chloride feed rate based on carbon tetrachloride and chlorobenzene (POHC) injection rates. This does not account for other chlorides present Basin F liquid, therefore greater than values are reported for HCl removal efficiency.

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TABLE 5-2
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:						
Test run number	1	1	1	1	1	1
Test location	STACK	STACK	STACK	STACK	STACK	STACK
Test date	06-10-93	06-10-93	06-10-93	06-10-93	06-10-93	06-10-93
Test time	0808-0828	0840-0900	0914-0934	0946-1006	1019-1039	1049-1109
Test tube pair	1	2	3	4	5	6
SAMPLING DATA:						
Duration, minutes	20.00	20.00	20.00	20.00	20.00	20.00
Average dry gas meter press. in. H_2O	1.450	1.475	1.500	1.475	1.500	1.500
Average dry gas meter temp. deg. C	27.75	29.25	30.50	31.50	32.00	33.25
Average dry gas meter temp. deg. F	81.95	84.65	86.90	88.70	89.60	91.85
Average absolute meter temp. deg. R	541.95	544.65	546.90	548.70	549.60	551.85
Actual sample volume, liters	22.362	22.450	22.435	22.450	22.360	22.230
Meter box calibration, Y	0.9963	0.9963	0.9963	0.9963	0.9963	0.9963
Barometric pressure, in. Hg	24.79	24.79	24.79	24.79	24.79	24.79
Sample volume, dscf	0.6376	0.6370	0.6340	0.6323	0.6288	0.6226
Volumetric flow rate, dscf/min (2)	7775	7775	7775	7775	7775	7775
LABORATORY DATA, ng:						
Chloromethane (Methyl Chloride)	935	285	155	145	179	125
Bromomethane (Methyl Bromide)	47 J	32 J	31 J	100 U	48 J	100 U
Vinyl Chloride	100 U	100 U	100 U	100 U	100 U	100 U
Chloroethane (Ethyl Chloride)	100 U	100 U	100 U	100 U	100 U	100 U
Methylene chloride (1)	1759 B	2059 B	2009 B	509 E,B	499 E,B	1489 B
Carbon Disulfide	22 J	50 U	50 U	19 J	20 J	50 U
1,1-Dichloroethene	50 U	50 U	50 U	50 U	50 U	50 U
1,1-Dichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
1,2-Dichloroethene (total)	50 U	50 U	50 U	50 U	50 U	50 U
Chloroform	613	713 J	667	816 J	850	814
1,2-Dichloroethane (EDC)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,1-Trichloroethane (TCA)	50 U	50 U	50 U	50 U	50 U	50 U
Carbon Tetrachloride	18 J	18 J	14 J	50 U	21 J	50 U
Bromodichloromethane	143	153	163	183	153	173
1,2-Dichloropropane	50 U	50 U	50 U	50 U	50 U	50 U
cis-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Trichloroethene (TCE)	50 U	50 U	50 U	50 U	50 U	50 U
Dibromochloromethane	26 J	27 J	29 J	31 J	27 J	29 J
1,1,2-Trichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Benzene	113	50 U	50 U	77	99	50 U
trans-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Bromoform	50 U	50 U	50 U	50 U	50 U	50 U
Tetrachloroethene (PCE)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,2,2-Tetrachloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Toluene	153 J	113	111	123	113	113
Chlorobenzene	22 J	21 J	19 J	20 J	19 J	20 J
Ethylbenzene	50 U	50 U	50 U	31 J	50 U	50 U
Styrene	543	513	513	553	493	493
Xylenes(total)	25 J	19 J	19 J	28 J	23 J	19 J
Dimethyldisulfide	50 U	50 U	50 U	50 U	50 U	50 U

J = Quantified below the detection limit.
B = Detected in blank train; reported values have been blank corrected
U = Compound not detected; detection limit shown. Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng)
E = Compound detected above the instrument calibration range.
(1) Commonly used laboratory solvents detected in samples and blanks; the reported values may not be representative.
(2) Volumetric flow rates based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number	1		1		1		1		1		1		1	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		AVERAGE (2)	
Test time	0808-0828		0840-0900		0914-0934		0946-1006		1019-1039		1049-1109			
Test tube pair	1		2		3		4		5		6			
POHC EMISSIONS (lbs/dscf):														
Carbon Tetrachloride		6.05E-11		6.06E-11		4.87E-11	ND <	1.74E-10		7.19E-11	ND <	1.77E-10	ND <	1.77E-10
Chlorobenzene		7.43E-11		7.09E-11		6.43E-11		6.80E-11		6.49E-11		6.91E-11		6.86E-11
VOST EMISSIONS (lbs/dscf):														
Chloromethane (Methyl Chloride)		3.23E-09		9.86E-10		5.39E-10		5.06E-10		6.28E-10		4.43E-10		1.06E-09
Bromomethane (Methyl Bromide)		1.63E-10		1.11E-10		1.08E-10	ND <	3.49E-10		1.68E-10	ND <	3.54E-10	ND <	3.54E-10
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		6.08E-09		7.13E-09		6.99E-09		1.77E-09		1.75E-09		5.27E-09		6.37E-09
Carbon Disulfide		7.43E-11	ND <	1.73E-10	ND <	1.74E-10		6.45E-11		6.84E-11	ND <	1.77E-10	ND <	1.77E-10
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		2.12E-09		2.47E-09		2.32E-09		2.85E-09		2.98E-09		2.88E-09		2.60E-09
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane		4.93E-10		5.28E-10		5.65E-10		6.36E-10		5.35E-10		6.11E-10		5.61E-10
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		8.82E-11		9.17E-11		9.91E-11		1.06E-10		9.29E-11		1.01E-10		9.65E-11
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene		3.89E-10	ND <	1.73E-10	ND <	1.74E-10		2.67E-10		3.45E-10	ND <	1.77E-10		2.11E-10
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		5.29E-10		3.89E-10		3.84E-10		4.27E-10		3.94E-10		3.98E-10		4.20E-10
Ethylbenzene	ND <	1.73E-10	ND <	1.73E-10	ND <	1.74E-10		1.06E-10	ND <	1.75E-10	ND <	1.77E-10	ND <	1.77E-10
Styrene		1.88E-09		1.77E-09		1.78E-09		1.93E-09		1.73E-09		1.74E-09		1.80E-09
Xylenes(total)		8.47E-11		6.40E-11		6.43E-11		9.59E-11		7.89E-11		6.55E-11		7.56E-11
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected using a blank train value. The reported values may not be representative. The average for methylene chloride is based upon tube pairs 1,2,3, and 6. One of the two tubes from each of test runs 4 and 5 was above the calibration range of the instrument, therefore the measured values for methylene chloride reported for tube pairs 4 and 5 are estimates.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number	1		1		1		1		1		1		1	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		AVERAGE (2)	
Test time	0808-0828		0840-0900		0914-0934		0946-1006		1019-1039		1049-1109			
Test tube pair	1		2		3		4		5		6			
POHC EMISSIONS (ppb/v):														
Carbon Tetrachloride		0.15		0.15		0.12	ND <	0.44		0.18	ND <	0.44	ND <	0.44
Chlorobenzene		0.25		0.24		0.22		0.23		0.22		0.24		0.23
VOST EMISSIONS (ppb/v):														
Chloromethane (Methyl Chloride)		24.67		7.53		4.11		3.86		4.79		3.38		8.06
Bromomethane (Methyl Bromide)		0.66		0.45		0.44	ND <	1.42		0.68	ND <	1.44	ND <	1.44
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		27.60		32.33		31.70		8.05		7.94		23.92		28.89
Carbon Disulfide		0.38	ND <	0.88	ND <	0.88		0.33		0.35	ND <	0.90	ND <	0.90
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		6.84		7.97		7.49		9.18		9.62		9.31		8.40
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane		1.16		1.24		1.33		1.50		1.26		1.44		1.32
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		0.16		0.17		0.18		0.20		0.17		0.19		0.18
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene		1.92	ND <	0.85	ND <	0.86		1.32		1.70	ND <	0.87		1.04
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		2.21		1.63		1.61		1.79		1.65		1.67		1.76
Ethylbenzene	ND <	0.63	ND <	0.63	ND <	0.63		0.39	ND <	0.64	ND <	0.64	ND <	0.64
Styrene		6.94		6.56		6.59		7.13		6.39		6.45		6.68
Xylenes(total)		0.31		0.23		0.23		0.35		0.29		0.24		0.27
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected using a blank train value. The reported values may not be representative. The average for methylene chloride is based upon tube pairs 1,2,3, and 6. One of the two tubes from each of test runs 4 and 5 was above the calibration range of the instrument, therefore the measured values for methylene chloride reported for tube pairs 4 and 5 are estimates.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number		1		1		1		1		1		1		1
Test location		STACK		STACK		STACK		STACK		STACK		STACK		STACK
Test date		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		AVERAGE (2)
Test time		0808-0828		0840-0900		0914-0934		0946-1006		1019-1039		1049-1109		
Test tube pair		1		2		3		4		5		6		
POHC EMISSIONS (lb/hr): (3)														
Carbon Tetrachloride		2.82E-05		2.83E-05		2.27E-05	ND <	8.13E-05		3.35E-05	ND <	8.26E-05	ND <	8.26E-05
Chlorobenzene		3.47E-05		3.31E-05		3.00E-05		3.17E-05		3.03E-05		3.22E-05		3.20E-05
VOST EMISSIONS (lb/hr): (3)														
Chloromethane (Methyl Chloride)		1.51E-03		4.60E-04		2.51E-04		2.36E-04		2.93E-04		2.06E-04		4.92E-04
Bromomethane (Methyl Bromide)		7.58E-05		5.17E-05		5.03E-05	ND <	1.63E-04		7.85E-05	ND <	1.65E-04	ND <	1.65E-04
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		2.84E-03		3.32E-03		3.26E-03		8.28E-04		8.16E-04		2.46E-03		2.97E-03
Carbon Disulfide		3.47E-05	ND <	8.07E-05	ND <	8.11E-05		3.01E-05		3.19E-05	ND <	8.26E-05	ND <	8.26E-05
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		9.88E-04		1.15E-03		1.08E-03		1.33E-03		1.39E-03		1.34E-03		1.21E-03
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane		2.30E-04		2.46E-04		2.64E-04		2.97E-04		2.49E-04		2.85E-04		2.62E-04
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		4.11E-05		4.28E-05		4.62E-05		4.96E-05		4.33E-05		4.71E-05		4.50E-05
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene		1.81E-04	ND <	8.07E-05	ND <	8.11E-05		1.24E-04		1.61E-04	ND <	8.26E-05		9.82E-05
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		2.47E-04		1.82E-04		1.79E-04		1.99E-04		1.84E-04		1.86E-04		1.96E-04
Ethylbenzene	ND <	8.06E-05	ND <	8.07E-05	ND <	8.11E-05		4.96E-05	ND <	8.18E-05	ND <	8.26E-05	ND <	8.26E-05
Styrene		8.75E-04		8.27E-04		8.31E-04		8.99E-04		8.06E-04		8.14E-04		8.42E-04
Xylenes(total)		3.95E-05		2.99E-05		3.00E-05		4.47E-05		3.68E-05		3.06E-05		3.52E-05
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected using a blank train value. The reported values may not be representative. The average for methylene chloride is based upon tube pairs 1,2,3, and 6. One of the two tubes from each of test runs 4 and 5 was above the calibration range of the instrument, therefore the measured values for methylene chloride reported for tube pairs 4 and 5 are estimates.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).
(3) Volumetric flow rates used to calculate mass emissions are based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:																
Test run number		1		1		1		1		1		1		1		
Test location		STACK		STACK		STACK		STACK		STACK		STACK		STACK		
Test date		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		06-10-93		AVERAGE (2)		
Test time		0808-0828		0840-0900		0914-0934		0946-1006		1019-1039		1049-1109				
Test tube pair		1		2		3		4		5		6				
POHC EMISSIONS (ug/m^3):																
Carbon Tetrachloride		0.97		0.97		0.78	ND <	2.79		1.15	ND <	2.84	ND <	2.84		
Chlorobenzene		1.19		1.14		1.03		1.09		1.04		1.11		1.10		
VOST EMISSIONS (ug/m^3):																
Chloromethane (Methyl Chloride)		51.78		15.80		8.63		8.10		10.05		7.09		16.91		
Bromomethane (Methyl Bromide)		2.60		1.77		1.73	ND <	5.58		2.70	ND <	5.67	ND <	5.67		
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND			
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND			
Methylene chloride (1)		97.41		114.14		111.89		28.43		28.02		84.45		101.97		
Carbon Disulfide		1.19	ND <	2.77	ND <	2.78		1.03		1.10	ND <	2.84	ND <	2.84		
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND			
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND			
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND			
Chloroform		33.92		39.52		37.15		45.57		47.73		46.17		41.68		
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND			
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND			
Bromodichloromethane		7.89		8.45		9.05		10.19		8.56		9.78		8.99		
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND			
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND			
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND			
Dibromochloromethane		1.41		1.47		1.59		1.70		1.49		1.62		1.55		
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND			
Benzene		6.23	ND <	2.77	ND <	2.78		4.27		5.53	ND <	2.84		3.37		
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND			
Bromoform	ND		ND		ND		ND		ND		ND		ND			
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND			
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND			
Toluene		8.47		6.24		6.15		6.84		6.32		6.38		6.73		
Ethylbenzene	ND <	2.77	ND <	2.77	ND <	2.78		1.70	ND <	2.81	ND <	2.84	ND <	2.84		
Styrene		30.04		28.41		28.54		30.85		27.66		27.93		28.91		
Xylenes(total)		1.36		1.03		1.03		1.54		1.26		1.05		1.21		
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND			

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected using a blank train value. The reported values may not be representative. The average for methylene chloride is based upon tube pairs 1,2,3, and 6. One of the two tubes from each of test runs 4 and 5 was above the calibration range of the instrument, therefore the measured values for methylene chloride reported for tube pairs 4 and 5 are estimates.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:						
Test run number	2	2	2	2	2	2
Test location	STACK	STACK	STACK	STACK	STACK	STACK
Test date	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93
Test time	0738-0758	0810-0830	0848-0908	0920-0940	0954-1014	1027-1047
Test tube pair	1	2	3	4	5	6
SAMPLING DATA:						
Duration, minutes	20.00	20.00	20.00	20.00	20.00	20.00
Average dry gas meter press. in. H_2O	1.500	1.450	1.500	1.475	1.425	1.475
Average dry gas meter temp. deg. C	31.00	32.50	33.75	35.00	35.50	36.25
Average dry gas meter temp. deg. F	87.80	90.50	92.75	95.00	95.90	97.25
Average absolute meter temp. deg. R	547.80	550.50	552.75	555.00	555.90	557.25
Actual sample volume, liters	22.196	21.688	21.975	22.047	21.565	21.946
Meter box calibration, Y	0.9963	0.9963	0.9963	0.9963	0.9963	0.9963
Barometric pressure, in. Hg	24.57	24.57	24.57	24.57	24.57	24.57
Sample volume, dscf	0.6207	0.6034	0.6090	0.6085	0.5941	0.6032
Volumetric flow rate, dscf/min (2)	7900	7900	7900	7900	7900	7900
LABORATORY DATA, ng:						
Chloromethane (Methyl Chloride)	515	155	195	165	155	255
Bromomethane (Methyl Bromide)	35 J	100 U	100 U	100 U	100 U	31 J
Vinyl Chloride	100 U	100 U	100 U	100 U	100 U	100 U
Chloroethane (Ethyl Chloride)	100 U	100 U	100 U	100 U	100 U	100 U
Methylene chloride (1)	1388 B	1108 B	1508 B	1658 B	1678 B	1768 B
Carbon Disulfide	19 J	50 U	50 U	50 U	19 J	20 J
1,1-Dichloroethene	50 U	50 U	50 U	50 U	50 U	50 U
1,1-Dichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
1,2-Dichloroethene (total)	50 U	50 U	50 U	50 U	50 U	50 U
Chloroform	897 J	842 J	821 J	916 J	939 J	764 J
1,2-Dichloroethane (EDC)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,1-Trichloroethane (TCA)	20 J	50 U	50 U	50 U	50 U	50 U
Carbon Tetrachloride	186 J	31 J	50 U	50 U	50 U	50 U
Bromodichloromethane	173	183	163	193	193	163
1,2-Dichloropropane	50 U	50 U	50 U	50 U	50 U	50 U
cis-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Trichloroethene (TCE)	50 U	50 U	50 U	50 U	50 U	50 U
Dibromochloromethane	29 J	32 J	28 J	34 J	35 J	29 J
1,1,2-Trichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Benzene	50 U	50 U	50 U	50 U	50 U	50 U
trans-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Bromoform	50 U	50 U	50 U	50 U	50 U	50 U
Tetrachloroethene (PCE)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,2,2-Tetrachloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Toluene	111 J	113	102	123	133	102
Chlorobenzene	30 J	18 J	50 U	19 J	19 J	18 J
Ethylbenzene	50 U	50 U	50 U	50 U	50 U	50 U
Styrene	343	443	393	503	513	383
Xylenes(total)	16 J	19 J	50 U	19 J	27 J	33 J
Dimethyldisulfide	50 U	50 U	50 U	50 U	50 U	50 U

J = Quantified below the detection limit.
B = Detected in blank train; reported values have been blank corrected
U = Compound not detected; detection limit shown. Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng)
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) Volumetric flow rates based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:							
Test run number	2	2	2	2	2	2	2
Test location	STACK	STACK	STACK	STACK	STACK	STACK	STACK
Test date	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93	AVERAGE (2)
Test time	0738-0758	0810-0830	0848-0908	0920-0940	0954-1014	1027-1047	
Test tube pair	1	2	3	4	5	6	
POHC EMISSIONS (lbs/dscf):							
Carbon Tetrachloride	6.61E-10	1.11E-10	ND< 1.81E-10	ND< 1.81E-10	ND< 1.86E-10	ND< 1.83E-10	1.90E-10
Chlorobenzene	1.07E-10	6.39E-11	ND< 1.81E-10	6.70E-11	6.86E-11	6.40E-11	ND< 1.81E-10
VOST EMISSIONS (lbs/dscf):							
Chloromethane (Methyl Chloride)	1.83E-09	5.66E-10	7.06E-10	5.98E-10	5.75E-10	9.32E-10	8.68E-10
Bromomethane (Methyl Bromide)	1.24E-10	ND< 3.65E-10	ND< 3.62E-10	ND< 3.62E-10	ND< 3.71E-10	1.13E-10	ND< 3.71E-10
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
Chloroethane (Ethyl Chloride)	ND	ND	ND	ND	ND	ND	ND
Methylene chloride (1)	4.93E-09	4.05E-09	5.46E-09	6.01E-09	6.23E-09	6.46E-09	5.52E-09
Carbon Disulfide	6.57E-11	ND< 1.83E-10	ND< 1.81E-10	ND< 1.81E-10	6.86E-11	7.13E-11	ND< 1.83E-10
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND
Chloroform	3.19E-09	3.08E-09	2.97E-09	3.32E-09	3.48E-09	2.79E-09	3.14E-09
1,2-Dichloroethane (EDC)	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (TCA)	6.93E-11	ND< 1.83E-10	ND< 1.81E-10	ND< 1.81E-10	ND< 1.86E-10	ND< 1.83E-10	ND< 1.86E-10
Bromodichloromethane	6.13E-10	6.67E-10	5.88E-10	6.97E-10	7.14E-10	5.94E-10	6.46E-10
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	1.01E-10	1.15E-10	9.96E-11	1.21E-10	1.28E-10	1.04E-10	1.12E-10
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND
Toluene	3.94E-10	4.11E-10	3.67E-10	4.44E-10	4.92E-10	3.71E-10	4.13E-10
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND
Styrene	1.22E-09	1.62E-09	1.42E-09	1.82E-09	1.90E-09	1.40E-09	1.56E-09
Xylenes(total)	5.68E-11	6.76E-11	ND< 1.81E-10	6.70E-11	9.83E-11	1.19E-10	ND< 1.81E-10
Dimethyldisulfide	ND	ND	ND	ND	ND	ND	ND

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:																				
Test run number	2		2		2		2		2		2		2		2		2		2	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		AVERAGE (2)	
Test time	0738-0758		0810-0830		0848-0908		0920-0940		0954-1014		1027-1047									
Test tube pair	1		2		3		4		5		6									
POHC EMISSIONS (ppb/v):																				
Carbon Tetrachloride		1.66		0.28	ND<	0.45	ND<	0.45	ND<	0.46	ND<	0.46								0.47
Chlorobenzene		0.36		0.22	ND<	0.62		0.23		0.24		0.22					ND<	0.62		
VOST EMISSIONS (ppb/v):																				
Chloromethane (Methyl Chloride)		13.96		4.32		5.39		4.56		4.39		7.11								6.62
Bromomethane (Methyl Bromide)		0.50	ND<	1.48	ND<	1.47	ND<	1.47	ND<	1.51		0.46					ND<	1.51		
Vinyl Chloride	ND		ND		ND		ND		ND		ND						ND			
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND						ND			
Methylene chloride (1)		22.37		18.37		24.77		27.26		28.25		29.32								25.06
Carbon Disulfide		0.33	ND<	0.92	ND<	0.92	ND<	0.92		0.35		0.36					ND<	0.92		
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND						ND			
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND						ND			
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND						ND			
Chloroform		10.29		9.93		9.59		10.71		11.25		9.01								10.13
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND						ND			
1,1,1-Trichloroethane (TCA)		0.20	ND<	0.53	ND<	0.52	ND<	0.52	ND<	0.54	ND<	0.53					ND<	0.54		
Bromodichloromethane		1.44		1.57		1.38		1.64		1.68		1.40								1.52
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND						ND			
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND						ND			
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND						ND			
Dibromochloromethane		0.19		0.21		0.18		0.22		0.24		0.19								0.21
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND						ND			
Benzene	ND		ND		ND		ND		ND		ND						ND			
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND						ND			
Bromoform	ND		ND		ND		ND		ND		ND						ND			
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND						ND			
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND						ND			
Toluene		1.65		1.72		1.54		1.86		2.06		1.55								1.73
Ethylbenzene	ND		ND		ND		ND		ND		ND						ND			
Styrene		4.50		5.98		5.26		6.74		7.04		5.17								5.78
Xylenes(total)		0.21		0.25	ND<	0.66		0.24		0.36		0.43					ND<	0.66		
Dimethyldisulfide	ND		ND		ND		ND		ND		ND						ND			

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:							
Test run number	2	2	2	2	2	2	2
Test location	STACK	STACK	STACK	STACK	STACK	STACK	STACK
Test date	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93	06-11-93	AVERAGE (2)
Test time	0738-0758	0810-0830	0848-0908	0920-0940	0954-1014	1027-1047	
Test tube pair	1	2	3	4	5	6	
POHC EMISSIONS (lb/hr): (3)							
Carbon Tetrachloride	3.13E-04	5.28E-05	ND< 8.58E-05	ND< 8.59E-05	ND< 8.79E-05	ND< 8.66E-05	8.98E-05
Chlorobenzene	5.05E-05	3.03E-05	ND< 8.58E-05	3.18E-05	3.25E-05	3.03E-05	ND< 8.58E-05
VOST EMISSIONS (lb/hr): (3)							
Chloromethane (Methyl Chloride)	8.67E-04	2.68E-04	3.35E-04	2.83E-04	2.73E-04	4.42E-04	4.11E-04
Bromomethane (Methyl Bromide)	5.89E-05	ND< 1.73E-04	ND< 1.72E-04	ND< 1.72E-04	ND< 1.76E-04	5.37E-05	ND< 1.76E-04
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
Chloroethane (Ethyl Chloride)	ND	ND	ND	ND	ND	ND	ND
Methylene chloride (1)	2.34E-03	1.92E-03	2.59E-03	2.85E-03	2.95E-03	3.06E-03	2.62E-03
Carbon Disulfide	3.11E-05	ND< 8.66E-05	ND< 8.58E-05	ND< 8.59E-05	3.25E-05	3.38E-05	ND< 8.66E-05
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND
Chloroform	1.51E-03	1.46E-03	1.41E-03	1.57E-03	1.65E-03	1.32E-03	1.49E-03
1,2-Dichloroethane (EDC)	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (TCA)	3.28E-05	ND< 8.66E-05	ND< 8.58E-05	ND< 8.59E-05	ND< 8.79E-05	ND< 8.66E-05	ND< 8.79E-05
Bromodichloromethane	2.90E-04	3.16E-04	2.79E-04	3.31E-04	3.39E-04	2.81E-04	3.06E-04
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	4.80E-05	5.46E-05	4.72E-05	5.75E-05	6.07E-05	4.94E-05	5.29E-05
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND
Toluene	1.87E-04	1.95E-04	1.74E-04	2.10E-04	2.33E-04	1.76E-04	1.96E-04
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND
Styrene	5.77E-04	7.66E-04	6.73E-04	8.63E-04	9.01E-04	6.63E-04	7.41E-04
Xylenes(total)	2.69E-05	3.20E-05	ND< 8.58E-05	3.18E-05	4.66E-05	5.63E-05	ND< 8.58E-05
Dimethyldisulfide	ND	ND	ND	ND	ND	ND	ND

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).
(3) Volumetric flow rates used to calculate mass emissions are based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number	2		2		2		2		2		2		2	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		06-11-93		AVERAGE (2)	
Test time	0738-0758		0810-0830		0848-0908		0920-0940		0954-1014		1027-1047			
Test tube pair	1		2		3		4		5		6			
POHC EMISSIONS (ug/m^3):														
Carbon Tetrachloride		10.58		1.78	ND<	2.90	ND<	2.90	ND<	2.97	ND<	2.93		3.04
Chlorobenzene		1.71		1.02	ND<	2.90		1.07		1.10		1.02	ND<	2.90
VOST EMISSIONS (ug/m^3):														
Chloromethane (Methyl Chloride)		29.30		9.07		11.31		9.58		9.21		14.93		13.90
Bromomethane (Methyl Bromide)		1.99	ND<	5.85	ND<	5.80	ND<	5.80	ND<	5.94		1.81	ND<	5.94
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		78.96		64.84		87.44		96.22		99.73		103.49		88.45
Carbon Disulfide		1.05	ND<	2.93	ND<	2.90	ND<	2.90		1.10		1.14	ND<	2.93
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		51.03		49.27		47.60		53.16		55.81		44.72		50.27
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)		1.11	ND<	2.93	ND<	2.90	ND<	2.90	ND<	2.97	ND<	2.93	ND<	2.97
Bromodichloromethane		9.81		10.68		9.42		11.17		11.44		9.51		10.34
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		1.62		1.84		1.59		1.94		2.05		1.67		1.79
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene	ND		ND		ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		6.31		6.58		5.89		7.11		7.88		5.94		6.62
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND	
Styrene		19.49		25.89		22.76		29.16		30.46		22.39		25.02
Xylenes(total)		0.91		1.08	ND<	2.90		1.07		1.58		1.90	ND<	2.90
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:						
Test run number	3	3	3	3	3	3
Test location	STACK	STACK	STACK	STACK	STACK	STACK
Test date	06-12-93	06-12-93	06-12-93	06-12-93	06-12-93	06-12-93
Test time	0830-0850	0859-0919	0928-0948	1003-1023	1034-1054	1104-1124
Test tube pair	1	2	3	4	5	6
SAMPLING DATA:						
Duration, minutes	20.00	20.00	20.00	20.00	20.00	20.00
Average dry gas meter press. in. H_2O	1.500	1.450	1.450	1.500	1.450	1.500
Average dry gas meter temp. deg. C	35.50	37.00	38.00	39.00	39.00	39.75
Average dry gas meter temp. deg. F	95.90	98.60	100.40	102.20	102.20	103.55
Average absolute meter temp. deg. R	555.90	558.60	560.40	562.20	562.20	563.55
Actual sample volume, liters	22.338	21.590	21.313	21.898	21.590	22.097
Meter box calibration, Y	0.9963	0.9963	0.9963	0.9963	0.9963	0.9963
Barometric pressure, in. Hg	24.62	24.62	24.62	24.62	24.62	24.62
Sample volume, dscf	0.6168	0.5932	0.5837	0.5979	0.5894	0.6019
Volumetric flow rate, dscf/min (2)	7875	7875	7875	7875	7875	7875
LABORATORY DATA, ng:						
Chloromethane (Methyl Chloride)	1020	785	625	365	155	925
Bromomethane (Methyl Bromide)	34 J	40 J	32 J	100 U	100 U	100 U
Vinyl Chloride	100 U	100 U	100 U	100 U	100 U	100 U
Chloroethane (Ethyl Chloride)	100 U	100 U	100 U	100 U	100 U	100 U
Methylene chloride (1)	1032 B	1662 B	1742 B	1632 B	1942 B	2412 B
Carbon Disulfide	50 U	18 J	50 U	50 U	19 J	50 U
1,1-Dichloroethene	50 U	50 U	50 U	50 U	50 U	50 U
1,1-Dichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
1,2-Dichloroethene (total)	50 U	50 U	50 U	50 U	50 U	50 U
Chloroform	1013 J	1000	1008	868	830 J	638
1,2-Dichloroethane (EDC)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,1-Trichloroethane (TCA)	50 U	50 U	50 U	50 U	50 U	50 U
Carbon Tetrachloride	59 J	50 U	50 U	50 U	50 U	50 U
Bromodichloromethane	213	220 J	213	183	203	143
1,2-Dichloropropane	50 U	50 U	50 U	50 U	50 U	50 U
cis-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Trichloroethene (TCE)	50 U	50 U	50 U	50 U	50 U	50 U
Dibromochloromethane	41	42	39	33 J	37 J	29 J
1,1,2-Trichloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Benzene	50 U	50 U	50 U	50 U	67	50 U
trans-1,3-Dichloropropene	50 U	50 U	50 U	50 U	50 U	50 U
Bromoform	23 J	22 J	50 U	50 U	50 U	50 U
Tetrachloroethene (PCE)	50 U	50 U	50 U	50 U	50 U	50 U
1,1,2,2-Tetrachloroethane	50 U	50 U	50 U	50 U	50 U	50 U
Toluene	106 J	127 J	123	102	123	132
Chlorobenzene	16 J	19 J	19 J	50 U	19 J	50 U
Ethylbenzene	50 U	50 U	50 U	50 U	50 U	50 U
Styrene	383	518 J	463	403	533	423
Xylenes(total)	31 J	22 J	21 J	19 J	25 J	22 J
Dimethyldisulfide	50 U	50 U	50 U	50 U	50 U	50 U

J = Quantified below the detection limit.
B = Detected in blank train; reported values have been blank corrected
U = Compound not detected; detection limit shown. Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng)
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) Volumetric flow rates based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number	3		3		3		3		3		3		3	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		AVERAGE (2)	
Test time	0830-0850		0859-0919		0928-0948		1003-1023		1034-1054		1104-1124			
Test tube pair	1		2		3		4		5		6			
POHC EMISSIONS (lbs/dscf):														
Carbon Tetrachloride		2.11E-10	ND<	1.86E-10	ND<	1.89E-10	ND<	1.84E-10	ND<	1.87E-10	ND<	1.83E-10	ND<	1.89E-10
Chlorobenzene		5.72E-11		6.88E-11		6.99E-11	ND<	1.84E-10		6.92E-11	ND<	1.83E-10	ND<	1.84E-10
VOST EMISSIONS (lbs/dscf):														
Chloromethane (Methyl Chloride)		3.65E-09		2.92E-09		2.36E-09		1.35E-09		5.80E-10		3.39E-09		2.37E-09
Bromomethane (Methyl Bromide)		1.22E-10		1.49E-10		1.21E-10	ND<	3.69E-10	ND<	3.74E-10	ND<	3.66E-10	ND<	3.74E-10
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		3.69E-09		6.18E-09		6.58E-09		6.02E-09		7.26E-09		8.84E-09		6.43E-09
Carbon Disulfide	ND<	1.79E-10		6.50E-11	ND<	1.89E-10	ND<	1.84E-10		6.92E-11	ND<	1.83E-10	ND<	1.89E-10
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		3.62E-09		3.72E-09		3.81E-09		3.20E-09		3.10E-09		2.34E-09		3.30E-09
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane		7.60E-10		8.18E-10		8.03E-10		6.73E-10		7.57E-10		5.22E-10		7.22E-10
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		1.45E-10		1.54E-10		1.45E-10		1.20E-10		1.37E-10		1.04E-10		1.34E-10
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene	ND<	1.79E-10	ND<	1.86E-10	ND<	1.89E-10	ND<	1.84E-10		2.49E-10	ND<	1.83E-10	ND<	1.89E-10
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform		8.04E-11		7.99E-11	ND<	1.89E-10	ND<	1.84E-10	ND<	1.87E-10	ND<	1.83E-10	ND<	1.89E-10
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		3.79E-10		4.72E-10		4.63E-10		3.74E-10		4.58E-10		4.84E-10		4.38E-10
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND	
Styrene		1.37E-09		1.93E-09		1.75E-09		1.48E-09		1.99E-09		1.55E-09		1.68E-09
Xylenes(total)		1.11E-10		7.99E-11		7.74E-11		6.82E-11		9.16E-11		7.88E-11		8.45E-11
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:														
Test run number	3		3		3		3		3		3		3	
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK	
Test date	06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		AVERAGE (2)	
Test time	0830-0850		0859-0919		0928-0948		1003-1023		1034-1054		1104-1124			
Test tube pair	1		2		3		4		5		6			
POHC EMISSIONS (ppb/v):														
Carbon Tetrachloride		0.53	ND<	0.47	ND<	0.47	ND<	0.46	ND<	0.47	ND<	0.46	ND<	0.47
Chlorobenzene		0.20		0.24		0.24	ND<	0.63		0.24	ND<	0.63	ND<	0.63
VOST EMISSIONS (ppb/v):														
Chloromethane (Methyl Chloride)		27.83		22.27		18.02		10.27		4.43		25.86		18.11
Bromomethane (Methyl Bromide)		0.49		0.60		0.49	ND<	1.50	ND<	1.52	ND<	1.49	ND<	1.52
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND	
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND	
Methylene chloride (1)		16.74		28.03		29.85		27.30		32.96		40.09		29.16
Carbon Disulfide	ND<	0.90		0.33	ND<	0.96	ND<	0.93		0.35	ND<	0.93	ND<	0.96
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND	
Chloroform		11.69		12.00		12.29		10.33		10.02		7.54		10.65
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane		1.79		1.92		1.89		1.58		1.78		1.23		1.70
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane		0.27		0.29		0.27		0.22		0.25		0.19		0.25
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND	
Benzene	ND<	0.88	ND<	0.92	ND<	0.93	ND<	0.91		1.23	ND<	0.90	ND<	0.93
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND	
Bromoform		0.12		0.12	ND<	0.29	ND<	0.28	ND<	0.29	ND<	0.28	ND<	0.29
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND	
Toluene		1.58		1.97		1.93		1.57		1.92		2.02		1.83
Ethyl benzene	ND		ND		ND		ND		ND		ND		ND	
Styrene		5.06		7.12		6.46		5.49		7.37		5.73		6.20
Xylenes(total)		0.40		0.29		0.28		0.25		0.33		0.29		0.31
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND	

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:													
Test run number	3		3		3		3		3		3		3
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK
Test date	06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		AVERAGE (2)
Test time	0830-0850		0859-0919		0928-0948		1003-1023		1034-1054		1104-1124		
Test tube pair	1		2		3		4		5		6		
POHC EMISSIONS (lb/hr): (3)													
Carbon Tetrachloride		9.96E-05	ND<	8.78E-05	ND<	8.92E-05	ND<	8.71E-05	ND<	8.84E-05	ND<	8.65E-05	ND< 8.92E-05
Chlorobenzene		2.70E-05		3.25E-05		3.30E-05	ND<	8.71E-05		3.27E-05	ND<	8.65E-05	ND< 8.71E-05
VOST EMISSIONS (lb/hr): (3)													
Chloromethane (Methyl Chloride)		1.72E-03		1.38E-03		1.12E-03		6.36E-04		2.74E-04		1.60E-03	1.12E-03
Bromomethane (Methyl Bromide)		5.74E-05		7.02E-05		5.71E-05	ND<	1.74E-04	ND<	1.77E-04	ND<	1.73E-04	ND< 1.77E-04
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND
Methylene chloride (1)		1.74E-03		2.92E-03		3.11E-03		2.84E-03		3.43E-03		4.17E-03	3.04E-03
Carbon Disulfide	ND<	8.44E-05		3.07E-05	ND<	8.92E-05	ND<	8.71E-05		3.27E-05	ND<	8.65E-05	ND< 8.92E-05
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND
Chloroform		1.71E-03		1.76E-03		1.80E-03		1.51E-03		1.47E-03		1.10E-03	1.56E-03
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND
Bromodichloromethane		3.59E-04		3.86E-04		3.79E-04		3.18E-04		3.58E-04		2.47E-04	3.41E-04
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND
Dibromochloromethane		6.84E-05		7.29E-05		6.87E-05		5.66E-05		6.45E-05		4.93E-05	6.34E-05
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND
Benzene	ND<	8.44E-05	ND<	8.78E-05	ND<	8.92E-05	ND<	8.71E-05		1.18E-04	ND<	8.65E-05	ND< 8.92E-05
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND
Bromoform		3.80E-05		3.78E-05	ND<	8.92E-05	ND<	8.71E-05	ND<	8.84E-05	ND<	8.65E-05	ND< 8.92E-05
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND
Toluene		1.79E-04		2.23E-04		2.19E-04		1.77E-04		2.17E-04		2.28E-04	2.07E-04
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND
Styrene		6.46E-04		9.10E-04		8.25E-04		7.01E-04		9.41E-04		7.31E-04	7.92E-04
Xylenes(total)		5.24E-05		3.78E-05		3.66E-05		3.22E-05		4.33E-05		3.72E-05	3.99E-05
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).
(3) Volumetric flow rates used to calculate mass emissions are based on data gathered during isokinetic test runs.

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TABLE 5-2 (cont)
TRIAL BURN TEST PROGRAM
SUMMARY OF VOLATILE ORGANICS TEST DATA AND TEST RESULTS

TEST DATA:																						
Test run number	3		3		3		3		3		3		3		3							
Test location	STACK		STACK		STACK		STACK		STACK		STACK		STACK		STACK							
Test date	06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		06-12-93		AVERAGE (2)									
Test time	0830-0850		0859-0919		0928-0948		1003-1023		1034-1054		1104-1124											
Test tube pair	1		2		3		4		5		6											
POHC EMISSIONS (ug/m^3):																						
Carbon Tetrachloride		3.38	ND<	2.98	ND<	3.02	ND<	2.95	ND<	3.00	ND<	2.93	ND<	3.02								
Chlorobenzene		0.92		1.10		1.12	ND<	2.95		1.11	ND<	2.93	ND<	2.95								
VOST EMISSIONS (ug/m^3):																						
Chloromethane (Methyl Chloride)		58.39		46.73		37.81		21.56		9.29		54.27		38.01								
Bromomethane (Methyl Bromide)		1.95		2.38		1.94	ND<	5.91	ND<	5.99	ND<	5.87	ND<	5.99								
Vinyl Chloride	ND		ND		ND		ND		ND		ND		ND									
Chloroethane (Ethyl Chloride)	ND		ND		ND		ND		ND		ND		ND									
Methylene chloride (1)		59.08		98.94		105.39		96.39		116.35		141.51		102.94								
Carbon Disulfide	ND<	2.86		1.04	ND<	3.02	ND<	2.95		1.11	ND<	2.93	ND<	3.02								
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND									
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND									
1,2-Dichloroethene (total)	ND		ND		ND		ND		ND		ND		ND									
Chloroform		57.99		59.53		60.98		51.27		49.73		37.43		52.82								
1,2-Dichloroethane (EDC)	ND		ND		ND		ND		ND		ND		ND									
1,1,1-Trichloroethane (TCA)	ND		ND		ND		ND		ND		ND		ND									
Bromodichloromethane		12.17		13.10		12.86		10.78		12.13		8.36		11.56								
1,2-Dichloropropane	ND		ND		ND		ND		ND		ND		ND									
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND									
Trichloroethene (TCE)	ND		ND		ND		ND		ND		ND		ND									
Dibromochloromethane		2.32		2.47		2.33		1.92		2.19		1.67		2.15								
1,1,2-Trichloroethane	ND		ND		ND		ND		ND		ND		ND									
Benzene	ND<	2.86	ND<	2.98	ND<	3.02	ND<	2.95		3.98	ND<	2.93	ND<	3.02								
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND		ND		ND									
Bromoform		1.29		1.28	ND<	3.02	ND<	2.95	ND<	3.00	ND<	2.93	ND<	3.02								
Tetrachloroethene (PCE)	ND		ND		ND		ND		ND		ND		ND									
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND		ND		ND									
Toluene		6.07		7.56		7.41		5.99		7.34		7.74		7.02								
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND									
Styrene		21.90		30.84		27.98		23.77		31.90		24.79		26.86								
Xylenes(total)		1.77		1.28		1.24		1.09		1.47		1.26		1.35								
Dimethyldisulfide	ND		ND		ND		ND		ND		ND		ND									

ND = Compound not detected in any of the tube pairs.
ND < = Compound not detected in sample and quantified in another tube pair.
(1) Commonly used laboratory solvents detected in samples and blanks; reported values have been blank corrected. The reported values may not be representative.
(2) If a tube pair non-detect value is averaged with a tube pair detected value then half the detection limit is used for the tube pair non-detected value. If the average for the six tube pairs is less than the highest full detection limit of any single tube pair then the average is reported as ND < (highest detection limit for a tube pair). Detection limits are based on the sum of the tenax and tenax/charcoal tube fractions (ie. 50 or 100 ng).

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TRIAL BURN TEST PROGRAM
TABLE 5-3
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data			
Run number	1	2	3
Location		INCINERATOR STACK	
Date	06-10-93	06-11-93	06-12-93
Time period	0745-1501	0710-1258	0756-1416
Sampling Data			
Sampling duration, min.	240.0	240.0	240.0
Nozzle diameter, in.	0.355	0.355	0.355
Cross sectional nozzle area, sq.ft.	0.000687	0.000687	0.000687
Barometric pressure, in. Hg	24.79	24.57	24.62
Avg. orifice press. diff., in H_2O	1.35	1.45	1.44
Avg. dry gas meter temp., deg F	76	80	81
Avg. abs. dry gas meter temp., deg. R	536	540	541
Total liquid collected by train, ml	4703.0	4823.0	4830.0
Std. vol. of H_2O vapor coll., cu.ft.	221.4	227.0	227.4
Dry gas meter calibration factor	0.995	0.995	0.995
Sample vol. at meter cond., dcf	160.728	167.415	167.077
Sample vol. at std. cond., dscf (1)	131.135	134.248	134.118
Percent of isokinetic sampling	99.7	99.0	101.3
GAS STREAM COMPOSITION DATA			
CO_2, % by volume, dry basis	10.1	9.9	10.2
O_2, % by volume, dry basis	3.4	3.5	3.6
CO, % by volume dry basis	0.0	0.0	0.0
N_2, % by volume, dry basis	86.5	86.6	86.3
Molecular wt. of dry gas, lb/lb mole	29.75	29.73	29.77
H_2O vapor in gas stream, prop. by vol.	0.628	0.628	0.629
Mole fraction of dry gas	0.372	0.372	0.371
Molecular wt. of wet gas, lb/lb mole	22.4	22.4	22.4
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA			
Static pressure, in. H_2O	-0.13	-0.15	-0.13
Static pressure, in. Hg	-0.010	-0.011	-0.010
Absolute pressure, in. Hg	24.78	24.56	24.61
Avg. temperature, deg. F	184	184	183
Avg. absolute temperature, deg.R	644	644	643
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	12	12
Avg. gas stream velocity, ft./sec.	52.7	54.8	53.4
Stack/duct cross sectional area, sq.ft.	9.62	9.62	9.62
Avg. gas stream volumetric flow, wacf/min.	30400	31600	30800
Avg. gas stream volumetric flow, dscf/min.	7700	7900	7700

(1) Standard conditions = 68 degrees F. (20 deg. C.) and 29.92 in Hg (760 mm Hg)

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TRIAL BURN TEST PROGRAM
TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data								
Run number	1		2		3		AVERAGE	
Location			INCINERATOR STACK					
Date	06-10-93		06-11-93		06-12-93			
Time period	0745-1501		0710-1258		0756-1416			
Semivolatile Organic Compounds Laboratory Report Data, ug								
Phenol	ND		ND		ND		ND	
Bis (2-chloroethyl) ether	ND		ND		ND		ND	
2-Chlorophenol	ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND	
Benzyl alchohol	ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND	
2-Methylphenol	ND		ND		ND		ND	
bis-(2-Chloroisopropyl)ether	ND		ND		ND		ND	
4-Methylphenol	ND		ND		ND		ND	
N-Nitroso-Di-n-propylamine	ND		ND		ND		ND	
Hexachloroethane	ND		ND		ND		ND	
Nitrobenzene	ND		ND		ND		ND	
Isophorone	ND	B	ND	BC	ND	B	ND	
2-Nitrophenol	ND		ND		ND		ND	
2,4-Dimethylphenol	ND		ND		ND		ND	
Benzoic acid	ND<	50 B	ND<	50 B		53.5 B	ND<	50
bis(2-Chloroethoxy)methane	ND		ND		ND		ND	
2,4-Dichlorophenol	ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND	
Naphthalene	ND	B	ND	BC	ND	BC	ND	
4-Chloroaniline	ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND	
4-Chloro-3-methylphenol	ND		ND		ND		ND	
2-Mehtylnapthalene	ND		ND		ND		ND	
Hexachlorocyclopentadiene	ND		ND		ND		ND	
2,4,6-Trichlorophenol	ND		ND		ND		ND	
2,4,5-Trichlorophenol	ND		ND		ND		ND	
2-Chloronapthalene	ND		ND		ND		ND	
2-Nitroaniline	ND		ND		ND		ND	
Dimethylphthalate		5	ND<	10	ND<	10	ND<	10
Acenaphthylene	ND		ND		ND		ND	
2,6-Dinitrotoluene	ND		ND		ND		ND	
3-Nitroaniline	ND		ND		ND		ND	
Acenapthene	ND		ND		ND		ND	
2,4-Dinitrophenol	ND		ND		ND		ND	
4-Nitrophenol	ND		ND		ND		ND	
Dibenzofuran	ND		ND		ND		ND	
2,4-Dinitrotoluene	ND		ND		ND		ND	
Diethylphthalate		9		7		27		14
4-Chlorophenyl-phenylether	ND		ND		ND		ND	
Fluorene	ND		ND		ND		ND	
4-Nitroaniline	ND		ND		ND		ND	
4,6-Dinitro-2-methylphenol	ND		ND		ND		ND	
n-Nitrosodiphenylamine(1)	ND		ND		ND		ND	
4-Bromophenyl-phenylether	ND		ND		ND		ND	
Hexachlorobenzene	ND		ND		ND		ND	
Pentachlorophenol	ND		ND		ND		ND	
Phenanthrene	ND		ND		ND		ND	
Anthracene	ND		ND		ND		ND	
Carbazole	ND		ND		ND		ND	
Di-n-butylphthalate		30 B		23 B		26 B		26
Fluoranthene	ND		ND		ND		ND	
Pyrene	ND		ND		ND		ND	
Butylbenzylphthalate		14		14	ND<	10		11
3,3'-Dichlorobenzidine	ND		ND		ND		ND	
Benzo(a)anthracene	ND		ND		ND		ND	
Chrysene	ND		ND		ND		ND	
bis(2-Ethylhexyl)phthalate		20 BC		12 BC		14 BC		15
Di-n-Octylphalate	ND		ND		ND		ND	
Benzo(b)fluoranthene	ND		ND		ND		ND	
Benzo(k)fluoranthene	ND		ND		ND		ND	
Benzo(a)pyrene	ND		ND		ND		ND	
Indeno(1,2,3-cd)pyrene	ND		ND		ND		ND	
Dibenzo(a,h)anthracene	ND		ND		ND		ND	
Benzo(g,h,i)perylene	ND		ND		ND		ND	
Quinoline	ND		ND		ND		ND	
4,4-Dichlorobiphenyl	ND		ND		ND		ND	
Pentachlorobenzene	ND		ND		ND		ND	

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TRIAL BURN TEST PROGRAM
TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data								
Run number	1		2		3		AVERAGE	
Location			INCINERATOR STACK					
Date	06-10-93		06-11-93		06-12-93			
Time period	0745-1501		0710-1258		0756-1416			
Organochlorine Pesticides/PCB Laboratory Report Data, ug								
Alpha-BHC	ND		ND		ND		ND	
Beta-BHC	ND		ND		ND		ND	
Delta-BHC	ND		ND		ND		ND	
gamma-BHC	ND	B	ND	B	ND	B	ND	
Heptachlor	ND		ND		ND		ND	
Aldrin	ND		ND		ND		ND	
Heptachlor epoxide		0.285	ND<	0.1	ND<	0.1		0.13
Endosulfan I	ND		ND		ND		ND	
Dieldrin	ND		ND		ND		ND	
4,4'-DDE	ND		ND		ND		ND	
Endrin	ND		ND		ND		ND	
Isodrin	ND		ND		ND		ND	
Endosulfan II	ND		ND		ND		ND	
4,4'-DDD	ND		ND		ND		ND	
Endosulfan sulfate	ND		ND		ND		ND	
4,4'-DDT	ND		ND		ND		ND	
Methoxychlor	ND		ND		ND		ND	
Endrin ketone	ND		ND		ND		ND	
alpha-Chlordane	ND		ND		ND		ND	
gamma-Chlordane	ND		ND		ND		ND	
Toxaphene	ND		ND		ND		ND	
Aroclor-1016	ND		ND		ND		ND	
Aroclor-1221	ND		ND		ND		ND	
Aroclor-1232	ND		ND		ND		ND	
Aroclor-1242	ND		ND		ND		ND	
Aroclor-1248	ND		ND		ND		ND	
Aroclor-1254	ND		ND		ND		ND	
Aroclor-1260	ND		ND		ND		ND	
Organophosphorous Pesticides/PCB Compounds Laboratory Report Data, ug								
Atrazine	ND		ND		ND		ND	
Dichlorvos	ND		ND		ND		ND	
Mevinphos	ND		ND		ND		ND	
Ethoprop	ND		ND		ND		ND	
Naled	ND		ND		ND		ND	
Phorate	ND		ND		ND		ND	
Demeton, O	ND		ND		ND		ND	
Demeton, S	ND		ND		ND		ND	
Diazinon	ND		ND		ND		ND	
Disulfoton	ND		ND		ND		ND	
Methyl Parathion	ND		ND		ND		ND	
Ronnel	ND		ND		ND		ND	
Malathion	ND		ND		ND		ND	
Fenthion	ND		ND		ND		ND	
Ethyl Prathion	ND		ND		ND		ND	
Chlorpyrifos	ND		ND		ND		ND	
Fensulfothion	ND		ND		ND		ND	
Trichloronate	ND		ND		ND		ND	
Merphos	ND		ND		ND		ND	
Stirophos	ND		ND		ND		ND	
Bolstar	ND		ND		ND		ND	
Azinphos-methyl	ND		ND		ND		ND	
Coumaphos	ND		ND		ND		ND	
Supona	ND		ND		ND		ND	
Tokuthion	ND		ND		ND		ND	

B = Detected in blank train: reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data								
Run number	1		2		3		AVERAGE	
Location			INCINERATOR STACK					
Date	06-10-93		06-11-93		06-12-93			
Time period	0745-1501		0710-1258		0756-1416			
Semivolatile Organic Compounds Emission Concentration Data, lb/dscf								
Phenol	ND		ND		ND		ND	
Bis (2-chloroethyl) ether	ND		ND		ND		ND	
2-Chlorophenol	ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND	
Benzyl alchohol	ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND	
2-Methylphenol	ND		ND		ND		ND	
bis-(2-Chloroisopropyl)ether	ND		ND		ND		ND	
4-Methylphenol	ND		ND		ND		ND	
N-Nitroso-Di-n-propylamine	ND		ND		ND		ND	
Hexachloroethane	ND		ND		ND		ND	
Nitrobenzene	ND		ND		ND		ND	
Isophorone	ND	B	ND	BC	ND	B	ND	
2-Nitrophenol	ND		ND		ND		ND	
2,4-Dimethylphenol	ND		ND		ND		ND	
Benzoic acid	ND<	8.41E-10 B	ND<	8.21E-10 B		8.79E-10 B	ND<	8.41E-10
bis(2-Chloroethoxy)methane	ND		ND		ND		ND	
2,4-Dichlorophenol	ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND	
Naphthalene	ND	B	ND	BC	ND	BC	ND	
4-Chloroaniline	ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND	
4-Chloro-3-methylphenol	ND		ND		ND		ND	
2-Mehtylnapthalene	ND		ND		ND		ND	
Hexachlorocyclopentadiene	ND		ND		ND		ND	
2,4,6-Trichlorophenol	ND		ND		ND		ND	
2,4,5-Trichlorophenol	ND		ND		ND		ND	
2-Chloronapthalene	ND		ND		ND		ND	
2-Nitroanaline	ND		ND		ND		ND	
Dimethylpthalate		8.41E-11	ND<	1.64E-10	ND<	1.64E-10	ND<	1.64E-10
Acenapthylene	ND		ND		ND		ND	
2,6-Dinitrotoluene	ND		ND		ND		ND	
3-Nitroanaline	ND		ND		ND		ND	
Acenapthene	ND		ND		ND		ND	
2,4-Dinitrophenol	ND		ND		ND		ND	
4-Nitrophenol	ND		ND		ND		ND	
Dibenzofuran	ND		ND		ND		ND	
2,4-Dinitrotoluene	ND		ND		ND		ND	
Diethylphthalate		1.51E-10		1.15E-10		4.44E-10		2.37E-10
4-Chlorophenyl-phenylether	ND		ND		ND		ND	
Fluorene	ND		ND		ND		ND	
4-Nitroanaline	ND		ND		ND		ND	
4,6-Dinitro-2-methylphenol	ND		ND		ND		ND	
n-Nitrosodiphenylamine(1)	ND		ND		ND		ND	
4-Bromophenyl-phenylether	ND		ND		ND		ND	
Hexachlorobenzene	ND		ND		ND		ND	
Pentachlorophenol	ND		ND		ND		ND	
Phenanthrene	ND		ND		ND		ND	
Anthracene	ND		ND		ND		ND	
Carbazole	ND		ND		ND		ND	
Di-n-butylphthalate		5.04E-10 B		3.78E-10 B		4.27E-10 B		4.36E-10
Fluoranthene	ND		ND		ND		ND	
Pyrene	ND		ND		ND		ND	
Butylbenzylpthalate		2.35E-10		2.30E-10	ND<	1.64E-10		1.82E-10
3,3'-Dichlorobenzidine	ND		ND		ND		ND	
Benzo(a)anthracene	ND		ND		ND		ND	
Chrysene	ND		ND		ND		ND	
bis(2-Ethylhexyl)phthalate		3.36E-10 BC		1.97E-10 BC		2.30E-10 BC		2.54E-10
Di-n-Octylpthalate	ND		ND		ND		ND	
Benzo(b)fluoranthene	ND		ND		ND		ND	
Benzo(k)fluoranthene	ND		ND		ND		ND	
Benzo(a)pyrene	ND		ND		ND		ND	
Indeno(1,2,3-cd)pyrene	ND		ND		ND		ND	
Dibenzo(a,h)anthracene	ND		ND		ND		ND	
Benzo(g,h,i)perylene	ND		ND		ND		ND	
Quinoline	ND		ND		ND		ND	
4,4-Dichlorobiphenyl	ND		ND		ND		ND	
Pentachlorobenzene	ND		ND		ND		ND	

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data								
Run number	1		2		3		AVERAGE	
Location			INCINERATOR STACK					
Date	06-10-93		06-11-93		06-12-93			
Time period	0745-1501		0710-1258		0756-1416			
Organochlorine Pesticides/PCB Emission Concentration Data, lb/dscf								
Alpha-BHC	ND		ND		ND		ND	
Beta-BHC	ND		ND		ND		ND	
Delta-BHC	ND		ND		ND		ND	
gamma-BHC	ND	B	ND	B	ND	B	ND	
Heptachlor	ND		ND		ND		ND	
Aldrin	ND		ND		ND		ND	
Heptachlor epoxide		4.79E-12	ND<	1.64E-12	ND<	1.64E-12		2.14E-12
Endosulfan I	ND		ND		ND		ND	
Dieldrin	ND		ND		ND		ND	
4,4'-DDE	ND		ND		ND		ND	
Endrin	ND		ND		ND		ND	
Isodrin	ND		ND		ND		ND	
Endosulfan II	ND		ND		ND		ND	
4,4'-DDD	ND		ND		ND		ND	
Endosulfan sulfate	ND		ND		ND		ND	
4,4'-DDT	ND		ND		ND		ND	
Methoxychlor	ND		ND		ND		ND	
Endrin ketone	ND		ND		ND		ND	
alpha-Chlordane	ND		ND		ND		ND	
gamma-Chlordane	ND		ND		ND		ND	
Toxaphene	ND		ND		ND		ND	
Aroclor-1016	ND		ND		ND		ND	
Aroclor-1221	ND		ND		ND		ND	
Aroclor-1232	ND		ND		ND		ND	
Aroclor-1242	ND		ND		ND		ND	
Aroclor-1248	ND		ND		ND		ND	
Aroclor-1254	ND		ND		ND		ND	
Aroclor-1260	ND		ND		ND		ND	
Organophosphorous Pesticides/PCB Emission Concentration Data, lb/dscf								
Atrazine	ND		ND		ND		ND	
Dichlorvos	ND		ND		ND		ND	
Mevinphos	ND		ND		ND		ND	
Ethoprop	ND		ND		ND		ND	
Naled	ND		ND		ND		ND	
Phorate	ND		ND		ND		ND	
Demeton, O	ND		ND		ND		ND	
Demeton, S	ND		ND		ND		ND	
Diazinon	ND		ND		ND		ND	
Disulfoton	ND		ND		ND		ND	
Methyl Parathion	ND		ND		ND		ND	
Ronnel	ND		ND		ND		ND	
Malathion	ND		ND		ND		ND	
Fenthion	ND		ND		ND		ND	
Ethyl Prathion	ND		ND		ND		ND	
Chlorpyrifos	ND		ND		ND		ND	
Fensulfothion	ND		ND		ND		ND	
Trichloronate	ND		ND		ND		ND	
Merphos	ND		ND		ND		ND	
Stirophos	ND		ND		ND		ND	
Bolstar	ND		ND		ND		ND	
Azinphos-methyl	ND		ND		ND		ND	
Coumaphos	ND		ND		ND		ND	
Supona	ND		ND		ND		ND	
Tokuthion	ND		ND		ND		ND	

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TRIAL BURN TEST PROGRAM
TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data										
Run number	1		2		3		AVERAGE			
Location	INCINERATOR STACK									
Date	06-10-93		06-11-93		06-12-93					
Time period	0745-1501		0710-1258		0756-1416					
Semivolatile Organic Compounds Emission Concentration Data, ppb/v										
Phenol	ND		ND		ND		ND			
Bis (2-chloroethyl) ether	ND		ND		ND		ND			
2-Chlorophenol	ND		ND		ND		ND			
1,3-Dichlorobenzene	ND		ND		ND		ND			
1,4-Dichlorobenzene	ND		ND		ND		ND			
Benzyl alcohol	ND		ND		ND		ND			
1,2-Dichlorobenzene	ND		ND		ND		ND			
2-Methylphenol	ND		ND		ND		ND			
bis-(2-Chloroisopropyl)ether	ND		ND		ND		ND			
4-Methylphenol	ND		ND		ND		ND			
N-Nitroso-Di-n-propylamine	ND		ND		ND		ND			
Hexachloroethane	ND		ND		ND		ND			
Nitrobenzene	ND		ND		ND		ND			
Isophorone	ND	B	ND	BC	ND	B	ND			
2-Nitrophenol	ND		ND		ND		ND			
2,4-Dimethylphenol	ND		ND		ND		ND			
Benzoic acid	ND<	2.65 B	ND<	2.59 B		2.78 B	ND<	2.65		
bis(2-Chloroethoxy)methane	ND		ND		ND		ND			
2,4-Dichlorophenol	ND		ND		ND		ND			
1,2,4-Trichlorobenzene	ND		ND		ND		ND			
Naphthalene	ND	B	ND	BC	ND	BC	ND			
4-Chloroaniline	ND		ND		ND		ND			
Hexachlorobutadiene	ND		ND		ND		ND			
4-Chloro-3-methylphenol	ND		ND		ND		ND			
2-Methylnapthalene	ND		ND		ND		ND			
Hexachlorocyclopentadiene	ND		ND		ND		ND			
2,4,6-Trichlorophenol	ND		ND		ND		ND			
2,4,5-Trichlorophenol	ND		ND		ND		ND			
2-Chloronapthalene	ND		ND		ND		ND			
2-Nitroaniline	ND		ND		ND		ND			
Dimethylphthalate		0.17	ND<	0.33	ND<	0.33	ND<	0.33		
Acenaphthylene	ND		ND		ND		ND			
2,6-Dinitrotoluene	ND		ND		ND		ND			
3-Nitroaniline	ND		ND		ND		ND			
Acenapthene	ND		ND		ND		ND			
2,4-Dinitrophenol	ND		ND		ND		ND			
4-Nitrophenol	ND		ND		ND		ND			
Dibenzofuran	ND		ND		ND		ND			
2,4-Dinitrotoluene	ND		ND		ND		ND			
Diethylphthalate		0.26		0.20		0.77		0.41		
4-Chlorophenyl-phenylether	ND		ND		ND		ND			
Fluorene	ND		ND		ND		ND			
4-Nitroaniline	ND		ND		ND		ND			
4,6-Dinitro-2-methylphenol	ND		ND		ND		ND			
n-Nitrosodiphenylamine(1)	ND		ND		ND		ND			
4-Bromophenyl-phenylether	ND		ND		ND		ND			
Hexachlorobenzene	ND		ND		ND		ND			
Pentachlorophenol	ND		ND		ND		ND			
Phenanthrene	ND		ND		ND		ND			
Anthracene	ND		ND		ND		ND			
Carbazole	ND		ND		ND		ND			
Di-n-butylphthalate		0.70 B		0.52 B		0.59 B		0.60		
Fluoranthene	ND		ND		ND		ND			
Pyrene	ND		ND		ND		ND			
Butylbenzylphthalate		0.29		0.28	ND<	0.20		0.23		
3,3'-Dichlorobenzidine	ND		ND		ND		ND			
Benzo(a)anthracene	ND		ND		ND		ND			
Chrysene	ND		ND		ND		ND			
bis(2-Ethylhexyl)phthalate		0.33 BC		0.19 BC		0.23 BC		0.25		
Di-n-Octylphtalate	ND		ND		ND		ND			
Benzo(b)fluoranthene	ND		ND		ND		ND			
Benzo(k)fluoranthene	ND		ND		ND		ND			
Benzo(a)pyrene	ND		ND		ND		ND			
Indeno(1,2,3-cd)pyrene	ND		ND		ND		ND			
Dibenzo(a,h)anthracene	ND		ND		ND		ND			
Benzo(g,h,i)perylene	ND		ND		ND		ND			
Quinoline	ND		ND		ND		ND			
4,4-Dichlorobiphenyl	ND		ND		ND		ND			
Pentachlorobenzene	ND		ND		ND		ND			

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data												
Run number	1			2			3			AVERAGE		
Location	INCINERATOR STACK											
Date	06-10-93			06-11-93			06-12-93					
Time period	0745-1501			0710-1258			0756-1416					
Organochlorine Pesticides/PCB Emission Concentration Data, ppb/v												
Alpha-BHC	ND			ND			ND			ND		
Beta-BHC	ND			ND			ND			ND		
Delta-BHC	ND			ND			ND			ND		
gamma-BHC	ND		B	ND		B	ND		B	ND		
Heptachlor	ND			ND			ND			ND		
Aldrin	ND			ND			ND			ND		
Heptachlor epoxide		0.0049		ND<	0.0017		ND<	0.0017			0.0022	
Endosulfan I	ND			ND			ND			ND		
Dieldrin	ND			ND			ND			ND		
4,4'-DDE	ND			ND			ND			ND		
Endrin	ND			ND			ND			ND		
Isodrin	ND			ND			ND			ND		
Endosulfan II	ND			ND			ND			ND		
4,4'-DDD	ND			ND			ND			ND		
Endosulfan sulfate	ND			ND			ND			ND		
4,4'-DDT	ND			ND			ND			ND		
Methoxychlor	ND			ND			ND			ND		
Endrin ketone	ND			ND			ND			ND		
alpha-Chlordane	ND			ND			ND			ND		
gamma-Chlordane	ND			ND			ND			ND		
Toxaphene	ND			ND			ND			ND		
Arocior-1016	ND			ND			ND			ND		
Arocior-1221	ND			ND			ND			ND		
Arocior-1232	ND			ND			ND			ND		
Arocior-1242	ND			ND			ND			ND		
Arocior-1248	ND			ND			ND			ND		
Arocior-1254	ND			ND			ND			ND		
Arocior-1260	ND			ND			ND			ND		
Organophosphorous Pesticides/PCB Emission Concentration Data, ppb/v												
Atrazine	ND			ND			ND			ND		
Dichlorvos	ND			ND			ND			ND		
Mevinphos	ND			ND			ND			ND		
Ethoprop	ND			ND			ND			ND		
Naled	ND			ND			ND			ND		
Phorate	ND			ND			ND			ND		
Demeton, O	ND			ND			ND			ND		
Demeton, S	ND			ND			ND			ND		
Diazinon	ND			ND			ND			ND		
Disulfoton	ND			ND			ND			ND		
Methyl Parathion	ND			ND			ND			ND		
Ronnel	ND			ND			ND			ND		
Malathion	ND			ND			ND			ND		
Fenthion	ND			ND			ND			ND		
Ethyl Prathion	ND			ND			ND			ND		
Chlorpyrifos	ND			ND			ND			ND		
Fensulfothion	ND			ND			ND			ND		
Trichloronate	ND			ND			ND			ND		
Merphos	ND			ND			ND			ND		
Stirophos	ND			ND			ND			ND		
Bolstar	ND			ND			ND			ND		
Azinphos-methyl	ND			ND			ND			ND		
Coumaphos	ND			ND			ND			ND		
Supona	ND			ND			ND			ND		
Tokuthion	ND			ND			ND			ND		

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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DENVER, COLORADO
TRIAL BURN TEST PROGRAM
TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data												
Run number	1			2			3			AVERAGE		
Location	INCINERATOR STACK											
Date	06-10-93			06-11-93			06-12-93					
Time period	0745-1501			0710-1258			0756-1416.					
Semivolatile Organic Compounds Emission Concentration Data, ug/dscm												
Phenol	ND			ND			ND			ND		
Bis (2-chloroethyl) ether	ND			ND			ND			ND		
2-Chlorophenol	ND			ND			ND			ND		
1,3-Dichlorobenzene	ND			ND			ND			ND		
1,4-Dichlorobenzene	ND			ND			ND			ND		
Benzyl alchohol	ND			ND			ND			ND		
1,2-Dichlorobenzene	ND			ND			ND			ND		
2-Methylphenol	ND			ND			ND			ND		
bis-(2-Chloroisopropyl)ether	ND			ND			ND			ND		
4-Methylphenol	ND			ND			ND			ND		
N-Nitroso-Di-n-propylamine	ND			ND			ND			ND		
Hexachloroethane	ND			ND			ND			ND		
Nitrobenzene	ND			ND			ND			ND		
Isophorone	ND		B	ND		BC	ND		B	ND		
2-Nitrophenol	ND			ND			ND			ND		
2,4-Dimethylphenol	ND			ND			ND			ND		
Benzoic acid	ND<	13.46	B	ND<	13.15	B		14.09	B	ND<	13.46	
bis(2-Chloroethoxy)methane	ND			ND			ND			ND		
2,4-Dichlorophenol	ND			ND			ND			ND		
1.2,4-Trichlorobenzene	ND			ND			ND			ND		
Naphthalene	ND		B	ND		BC	ND		BC	ND		
4-Chloroaniline	ND			ND			ND			ND		
Hexachlorobutadiene	ND			ND			ND			ND		
4-Chloro-3-methylphenol	ND			ND			ND			ND		
2-Mehtylnapthalene	ND			ND			ND			ND		
Hexachlorocyclopentadiene	ND			ND			ND			ND		
2,4,6-Trichlorophenol	ND			ND			ND			ND		
2,4,5-Trichlorophenol	ND			ND			ND			ND		
2-Chloronapthalene	ND			ND			ND			ND		
2-Nitroaniline	ND			ND			ND			ND		
Dimethylphthalate		1.35		ND<	2.63		ND<	2.63		ND<	2.63	
Acenaphthylene	ND			ND			ND			ND		
2,6-Dinitrotoluene	ND			ND			ND			ND		
3-Nitroaniline	ND			ND			ND			ND		
Acenapthene	ND			ND			ND			ND		
2,4-Dinitrophenol	ND			ND			ND			ND		
4-Nitrophenol	ND			ND			ND			ND		
Dibenzofuran	ND			ND			ND			ND		
2,4-Dinitrotoluene	ND			ND			ND			ND		
Diethylphthalate		2.42			1.84			7.11			3.79	
4-Chlorophenyl-phenylether	ND			ND			ND			ND		
Fluorene	ND			ND			ND			ND		
4-Nitroaniline	ND			ND			ND			ND		
4,6-Dinitro-2-methylphenol	ND			ND			ND			ND		
n-Nitrosodiphenylamine(1)	ND			ND			ND			ND		
4-Bromophenyl-phenylether	ND			ND			ND			ND		
Hexachlorobenzene	ND			ND			ND			ND		
Pentachlorophenol	ND			ND			ND			ND		
Phenanthrene	ND			ND			ND			ND		
Anthracene	ND			ND			ND			ND		
Carbazole	ND			ND			ND			ND		
Di-n-butylphthalate		8.08	B		6.05	B		6.85	B		6.99	
Fluoranthene	ND			ND			ND			ND		
Pyrene	ND			ND			ND			ND		
Butylbenzylphalate		3.77			3.68		ND<	2.63			2.92	
3,3'-Dichlorobenzidine	ND			ND			ND			ND		
Benzo(a)anthracene	ND			ND			ND			ND		
Chrysene	ND			ND			ND			ND		
bis(2-Ethylhexyl)phthalate		5.39	BC		3.16	BC		3.69	BC		4.08	
Di-n-Octylphthalate	ND			ND			ND			ND		
Benzo(b)fluoranthene	ND			ND			ND			ND		
Benzo(k)fluoranthene	ND			ND			ND			ND		
Benzo(a)pyrene	ND			ND			ND			ND		
Indeno(1,2,3-cd)pyrene	ND			ND			ND			ND		
Dibenzo(a,h)anthracene	ND			ND			ND			ND		
Benzo(g,h,i)perylene	ND			ND			ND			ND		
Quinoline	ND			ND			ND			ND		
4,4-Dichlorobiphenyl	ND			ND			ND			ND		
Pentachlorobenzene	ND			ND			ND			ND		

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data												
Run number	1			2			3			AVERAGE		
Location	INCINERATOR STACK											
Date	06-10-93			06-11-93			06-12-93					
Time period	0745-1501			0710-1258			0756-1416					
Organochlorine Pesticides/PCB Emission Concentration Data, ug/dscm												
Alpha-BHC	ND			ND			ND			ND		
Beta-BHC	ND			ND			ND			ND		
Delta-BHC	ND			ND			ND			ND		
gamma-BHC	ND		B	ND		B	ND		B	ND		
Heptachlor	ND			ND			ND			ND		
Aldrin	ND			ND			ND			ND		
Heptachlor epoxide		0.08		ND<	0.03		ND<	0.03			0.03	
Endosulfan I	ND			ND			ND			ND		
Dieldrin	ND			ND			ND			ND		
4,4'-DDE	ND			ND			ND			ND		
Endrin	ND			ND			ND			ND		
Isodrin	ND			ND			ND			ND		
Endosulfan II	ND			ND			ND			ND		
4,4'-DDD	ND			ND			ND			ND		
Endosulfan sulfate	ND			ND			ND			ND		
4,4'-DDT	ND			ND			ND			ND		
Methoxychlor	ND			ND			ND			ND		
Endrin ketone	ND			ND			ND			ND		
alpha-Chlordane	ND			ND			ND			ND		
gamma-Chlordane	ND			ND			ND			ND		
Toxaphene	ND			ND			ND			ND		
Aroclor-1016	ND			ND			ND			ND		
Aroclor-1221	ND			ND			ND			ND		
Aroclor-1232	ND			ND			ND			ND		
Aroclor-1242	ND			ND			ND			ND		
Aroclor-1248	ND			ND			ND			ND		
Aroclor-1254	ND			ND			ND			ND		
Aroclor-1260	ND			ND			ND			ND		
Organophosphorous Pesticides/PCB Emission Concentration Data, ug/dscm												
Atrazine	ND			ND			ND			ND		
Dichlorvos	ND			ND			ND			ND		
Mevinphos	ND			ND			ND			ND		
Ethoprop	ND			ND			ND			ND		
Naled	ND			ND			ND			ND		
Phorate	ND			ND			ND			ND		
Demeton, O	ND			ND			ND			ND		
Demeton, S	ND			ND			ND			ND		
Diazinon	ND			ND			ND			ND		
Disulfoton	ND			ND			ND			ND		
Methyl Parathion	ND			ND			ND			ND		
Ronnel	ND			ND			ND			ND		
Malathion	ND			ND			ND			ND		
Fenthion	ND			ND			ND			ND		
Ethyl Prathion	ND			ND			ND			ND		
Chlorpyrifos	ND			ND			ND			ND		
Fensulfothion	ND			ND			ND			ND		
Trichloronate	ND			ND			ND			ND		
Merphos	ND			ND			ND			ND		
Stirophos	ND			ND			ND			ND		
Bolstar	ND			ND			ND			ND		
Azinphos-methyl	ND			ND			ND			ND		
Coumaphos	ND			ND			ND			ND		
Supona	ND			ND			ND			ND		
Tokuthion	ND			ND			ND			ND		

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data												
Run number	1			2			3			AVERAGE		
Location	INCINERATOR STACK											
Date	06-10-93			06-11-93			06-12-93					
Time period	0745-1501			0710-1258			0756-1416					
Semivolatile Organic Compounds Mass Emission Data, lb/hr												
Phenol	ND			ND			ND			ND		
Bis (2-chloroethyl) ether	ND			ND			ND			ND		
2-Chlorophenol	ND			ND			ND			ND		
1,3-Dichlorobenzene	ND			ND			ND			ND		
1,4-Dichlorobenzene	ND			ND			ND			ND		
Benzyl alchohol	ND			ND			ND			ND		
1,2-Dichlorobenzene	ND			ND			ND			ND		
2-Methylphenol	ND			ND			ND			ND		
bis-(2-Chloroisopropyl)ether	ND			ND			ND			ND		
4-Methylphenol	ND			ND			ND			ND		
N-Nitroso-Di-n-propylamine	ND			ND			ND			ND		
Hexachloroethane	ND			ND			ND			ND		
Nitrobenzene	ND			ND			ND			ND		
Isophorone	ND		B	ND		BC	ND		B	ND		
2-Nitrophenol	ND			ND			ND			ND		
2,4-Dimethylphenol	ND			ND			ND			ND		
Benzoic acid	ND<	3.87E-04	B	ND<	3.90E-04	B		4.08E-04	B	ND<	3.90E-04	
bis(2-Chloroethoxy)methane	ND			ND			ND			ND		
2,4-Dichlorophenol	ND			ND			ND			ND		
1,2,4-Trichlorobenzene	ND			ND			ND			ND		
Naphthalene	ND		B	ND		BC	ND		BC	ND		
4-Chloroaniline	ND			ND			ND			ND		
Hexachlorobutadiene	ND			ND			ND			ND		
4-Chloro-3-methylphenol	ND			ND			ND			ND		
2-Mehtylnapthalene	ND			ND			ND			ND		
Hexachlorocyclopentadiene	ND			ND			ND			ND		
2,4,6-Trichlorophenol	ND			ND			ND			ND		
2,4,5-Trichlorophenol	ND			ND			ND			ND		
2-Chloronapthalene	ND			ND			ND			ND		
2-Nitroanaline	ND			ND			ND			ND		
Dimethylphthalate		3.87E-05		ND<	7.79E-05		ND<	7.62E-05		ND<	7.79E-05	
Acenaphthylene	ND			ND			ND			ND		
2,6-Dinitrotoluene	ND			ND			ND			ND		
3-Nitroanaline	ND			ND			ND			ND		
Acenapthene	ND			ND			ND			ND		
2,4-Dinitrophenol	ND			ND			ND			ND		
4-Nitrophenol	ND			ND			ND			ND		
Dibenzofuran	ND			ND			ND			ND		
2,4-Dinitrotoluene	ND			ND			ND			ND		
Diethylphthalate		6.97E-05			5.45E-05			2.06E-04			1.10E-04	
4-Chlorophenyl-phenylether	ND			ND			ND			ND		
Fluorene	ND			ND			ND			ND		
4-Nitroanaline	ND			ND			ND			ND		
4,6-Dinitro-2-methylphenol	ND			ND			ND			ND		
n-Nitrosodiphenylamine(1)	ND			ND			ND			ND		
4-Bromophenyl-phenylether	ND			ND			ND			ND		
Hexachlorobenzene	ND			ND			ND			ND		
Pentachlorophenol	ND			ND			ND			ND		
Phenanthrene	ND			ND			ND			ND		
Anthracene	ND			ND			ND			ND		
Carbazole	ND			ND			ND			ND		
Di-n-butylphthalate		2.32E-04	B		1.79E-04	B		1.98E-04	B		2.03E-04	
Fluoranthene	ND			ND			ND			ND		
Pyrene	ND			ND			ND			ND		
Butylbenzylphthalate		1.08E-04			1.09E-04		ND<	7.62E-05			8.52E-05	
3,3'-Dichlorobenzidine	ND			ND			ND			ND		
Benzo(a)anthracene	ND			ND			ND			ND		
Chrysene	ND			ND			ND			ND		
bis(2-Ethylhexyl)phthalate		1.55E-04	BC		9.35E-05	BC		1.07E-04	BC		1.18E-04	
Di-n-Octylphthalate	ND			ND			ND			ND		
Benzo(b)fluoranthene	ND			ND			ND			ND		
Benzo(k)fluoranthene	ND			ND			ND			ND		
Benzo(a)pyrene	ND			ND			ND			ND		
Indeno(1,2,3-cd)pyrene	ND			ND			ND			ND		
Dibenzo(a,h)anthracene	ND			ND			ND			ND		
Benzo(g,h,i)perylene	ND			ND			ND			ND		
Quinoline	ND			ND			ND			ND		
4,4-Dichlorobiphenyl	ND			ND			ND			ND		
Pentachlorobenzene	ND			ND			ND			ND		

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5-3 (cont)
SUMMARY OF SEMIVOLATILE ORGANIC COMPOUNDS TEST DATA AND TEST RESULTS

Test Data												
Run number	1			2			3			AVERAGE		
Location	INCINERATOR STACK											
Date	06-10-93			06-11-93			06-12-93					
Time period	0745-1501			0710-1258			0756-1416					
Organochlorine Pesticides/PCB Mass Emission Data, lb/hr												
Alpha-BHC	ND			ND			ND			ND		
Beta-BHC	ND			ND			ND			ND		
Delta-BHC	ND			ND			ND			ND		
gamma-BHC	ND		B	ND		B	ND		B	ND		
Heptachlor	ND			ND			ND			ND		
Aldrin	ND			ND			ND			ND		
Heptachlor epoxide		2.21E-06		ND<	7.79E-07		ND<	7.62E-07				9.92E-07
Endosulfan I	ND			ND			ND			ND		
Dieldrin	ND			ND			ND			ND		
4,4'-DDE	ND			ND			ND			ND		
Endrin	ND			ND			ND			ND		
Isodrin	ND			ND			ND			ND		
Endosulfan II	ND			ND			ND			ND		
4,4'-DDD	ND			ND			ND			ND		
Endosulfan sulfate	ND			ND			ND			ND		
4,4'-DDT	ND			ND			ND			ND		
Methoxychlor	ND			ND			ND			ND		
Endrin ketone	ND			ND			ND			ND		
alpha-Chlordane	ND			ND			ND			ND		
gamma-Chlordane	ND			ND			ND			ND		
Toxaphene	ND			ND			ND			ND		
Aroclor-1016	ND			ND			ND			ND		
Aroclor-1221	ND			ND			ND			ND		
Aroclor-1232	ND			ND			ND			ND		
Aroclor-1242	ND			ND			ND			ND		
Aroclor-1248	ND			ND			ND			ND		
Aroclor-1254	ND			ND			ND			ND		
Aroclor-1260	ND			ND			ND			ND		
Organophosphorous Pesticides/PCB Mass Emission Data, lb/hr												
Atrazine	ND			ND			ND			ND		
Dichlorvos	ND			ND			ND			ND		
Mevinphos	ND			ND			ND			ND		
Ethoprop	ND			ND			ND			ND		
Naled	ND			ND			ND			ND		
Phorate	ND			ND			ND			ND		
Demeton, O	ND			ND			ND			ND		
Demeton, S	ND			ND			ND			ND		
Diazinon	ND			ND			ND			ND		
Disulfoton	ND			ND			ND			ND		
Methyl Parathion	ND			ND			ND			ND		
Ronnel	ND			ND			ND			ND		
Malathion	ND			ND			ND			ND		
Fenthion	ND			ND			ND			ND		
Ethyl Prathion	ND			ND			ND			ND		
Chlorpyrifos	ND			ND			ND			ND		
Fensulfothion	ND			ND			ND			ND		
Trichloronate	ND			ND			ND			ND		
Merphos	ND			ND			ND			ND		
Stirophos	ND			ND			ND			ND		
Bolstar	ND			ND			ND			ND		
Azinphos-methyl	ND			ND			ND			ND		
Coumaphos	ND			ND			ND			ND		
Supona	ND			ND			ND			ND		
Tokuthion	ND			ND			ND			ND		

B = Detected in blank train; reported values have been blank corrected.
BC = Detected in blank train; test run values were less than blank train values.

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TABLE 5–4
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA			
Test run number	1	2	3
Test location		INCINERATOR STACK	
Test date	06-10-93	06-11-93	06-12-93
Test time period	0745-1501	0710-1258	0756-1416
SAMPLING DATA			
Sampling duration, min.	240.0	240.0	240.0
Nozzle diameter, in.	0.355	0.355	0.355
Cross sectional nozzle area, sq.ft.	0.000687	0.000687	0.000687
Barometric pressure, in. Hg	24.79	24.57	24.62
Avg. orifice press. diff., in H_2O	1.42	1.51	1.44
Avg. dry gas meter temp., deg F	78	80	81
Avg. abs. dry gas meter temp., deg. R	538	540	541
Total liquid collected by train, ml	4892.0	4914.0	4952.0
Std. vol. of H_2O vapor coll., cu.ft.	230.3	231.3	233.1
Dry gas meter calibration factor	1.010	1.010	1.010
Sample vol. at meter cond., dcf	168.721	173.104	170.963
Sample vol. at std. cond., dscf (1)	139.101	140.945	139.109
Percent of isokinetic sampling	104.7	103.3	105.4
GAS STREAM COMPOSITION DATA			
CO_2, % by volume, dry basis	10.1	9.8	10.2
O_2, % by volume, dry basis	3.4	3.7	3.4
CO, % by volume dry basis	0.0	0.0	0.0
N_2, % by volume, dry basis	86.5	86.6	86.4
Molecular wt. of dry gas, lb/lb mole	29.75	29.71	29.76
H_2O vapor in gas stream, prop. by vol.	0.623	0.621	0.626
Mole fraction of dry gas	0.377	0.379	0.374
Molecular wt. of wet gas, lb/lb mole	22.4	22.4	22.4
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA			
Static pressure, in. H_2O	-0.13	-0.13	-0.14
Static pressure, in. Hg	-0.010	-0.010	-0.010
Absolute pressure, in. Hg	24.78	24.56	24.61
Avg. temperature, deg. F	184	183	184
Avg. absolute temperature, deg.R	644	643	644
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	12	12
Avg. gas stream velocity, ft./sec.	52.5	54.1	52.9
Stack/duct cross sectional area, sq.ft.	9.62	9.62	9.62
Avg. gas stream volumetric flow, wacf/min.	30300	31200	30500
Avg. gas stream volumetric flow, dscf/min.	7800	8000	7700

(1) Standard conditions = 68 degrees F. (20 deg. C.) and 29.92 in Hg (760 mm Hg)

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA:								
Test run number		1			2			3
Test location					INCINERATOR STACK			
Test date		06-10-93			06-11-93			06-12-93
Test time period		0745-1501			0710-1258			0756-1416
DIOXIN LABORATORY REPORT DATA, ng								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		0.020		ND <	0.020			0.020
OCDD		0.040			0.030			0.070
Total TCDD	ND <	0.020			0.010			0.006
Total PeCDD		0.020		ND <	0.010		ND <	0.010
Total HxCDD	ND			ND			ND	
Total HpCDD		0.020		ND <	0.030			0.020
Total PCDD		0.080			0.040			0.096
DIOXIN CONCENTRATION, ppt/v								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		2.87E-04		ND <	2.83E-04			2.87E-04
OCDD		5.31E-04			3.93E-04			9.30E-04
Total TCDD	ND <	3.79E-04			1.87E-04			1.14E-04
Total PeCDD		3.43E-04		ND <	1.69E-04		ND <	1.71E-04
Total HxCDD	ND			ND			ND	
Total HpCDD		2.87E-04		ND <	4.25E-04			2.87E-04
Total PCDD		1.16E-03			5.81E-04			1.33E-03
DIOXIN EMISSIONS, lb/dscf								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		3.17E-16		ND <	3.13E-16			3.17E-16
OCDD		6.34E-16			4.69E-16			1.11E-15
Total TCDD	ND <	3.17E-16			1.56E-16			9.51E-17
Total PeCDD		3.17E-16		ND <	1.56E-16		ND <	1.58E-16
Total HxCDD	ND			ND			ND	
Total HpCDD		3.17E-16		ND <	4.69E-16			3.17E-16
Total PCDD		1.27E-15			6.26E-16			1.52E-15

ND = Not detected in sample train.
ND <= Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA:								
Test run number		1			2			3
Test location					INCINERATOR STACK			
Test date		06-10-93			06-11-93			06-12-93
Test time period		0745-1501			0710-1258			0756-1416
DIOXIN CONCENTRATION, ng/dscm								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		5.08E-06		ND <	5.01E-06			5.08E-06
1,2,3,4,6,7,8,9-OCDD		1.02E-05			7.52E-06			1.78E-05
Total TCDD	ND <	5.08E-06			2.51E-06			1.52E-06
Total PeCDD		5.08E-06		ND <	2.51E-06		ND <	2.54E-06
Total HxCDD	ND			ND			ND	
Total HpCDD		5.08E-06		ND <	7.52E-06			5.08E-06
Total PCDD		2.03E-05			1.00E-05			2.44E-05
DIOXIN EMISSIONS, lb/hr								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		1.47E-10		ND <	1.49E-10			1.46E-10
1,2,3,4,6,7,8,9-OCDD		2.95E-10			2.24E-10			5.12E-10
Total TCDD	ND <	1.47E-10			7.47E-11			4.39E-11
Total PeCDD		1.47E-10		ND <	7.47E-11		ND <	7.32E-11
Total HxCDD	ND			ND			ND	
Total HpCDD		1.47E-10		ND <	2.24E-10			1.46E-10
Total PCDD		5.90E-10			2.99E-10			7.03E-10

ND = Not detected in sample train.
ND < = Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA:						
Test run number		1		2		3
Test location				INCINERATOR STACK		
Test date		06-10-93		06-11-93		06-12-93
Test time period		0745-1501		0710-1258		0756-1416
FURAN LABORATORY REPORT DATA, ng						
2,3,7,8-TCDF		0.020		0.020	ND<	0.010
1,2,3,7,8-PeCDF	ND		ND		ND	
2,3,4,7,8-PeCDF	ND		ND		ND	
1,2,3,4,7,8-HxCDF		0.020	ND<	0.010	ND<	0.008
1,2,3,6,7,8-HxCDF	ND		ND		ND	
1,2,3,7,8,9-HxCDF	ND		ND		ND	
2,3,4,6,7,8-HxCDF	ND<	0.020		0.002	ND<	0.010
1,2,3,4,6,7,8-HpCDF		0.020		0.010	ND<	0.010
1,2,3,4,7,8,9-HpCDF	ND		ND		ND	
OCDF	ND		ND		ND	
Total TCDF		0.210		0.310		0.470
Total PeCDF		0.030	ND<	0.080	ND<	0.060
Total HxCDF		0.032		0.002	ND<	0.010
Total HpCDF		0.020		0.010	ND<	0.010
Total PCDF		0.292		0.322		0.470
FURAN CONCENTRATION, ppt/v						
2,3,7,8-TCDF		3.99E-04		3.94E-04	ND<	2.00E-04
1,2,3,7,8-PeCDF	ND		ND		ND	
2,3,4,7,8-PeCDF	ND		ND		ND	
1,2,3,4,7,8-HxCDF		3.26E-04	ND<	1.61E-04	ND<	1.30E-04
1,2,3,6,7,8-HxCDF	ND		ND		ND	
1,2,3,7,8,9-HxCDF	ND		ND		ND	
2,3,4,6,7,8-HxCDF	ND<	3.26E-04		3.22E-05	ND<	1.63E-04
1,2,3,4,6,7,8-HpCDF		2.98E-04		1.47E-04	ND<	1.49E-04
1,2,3,4,7,8,9-HpCDF	ND		ND		ND	
OCDF	ND		ND		ND	
Total TCDF		4.19E-03		6.11E-03		9.38E-03
Total PeCDF		5.38E-04	ND<	1.42E-03	ND<	1.08E-03
Total HxCDF		5.21E-04		3.22E-05	ND<	1.63E-04
Total HpCDF		2.98E-04		1.47E-04	ND<	1.49E-04
Total PCDF		5.55E-03		6.29E-03		9.38E-03
FURAN EMISSIONS, lb/dscf						
2,3,7,8-TCDF		3.17E-16		3.13E-16	ND<	1.58E-16
1,2,3,7,8-PeCDF	ND		ND		ND	
2,3,4,7,8-PeCDF	ND		ND		ND	
1,2,3,4,7,8-HxCDF		3.17E-16	ND<	1.56E-16	ND<	1.27E-16
1,2,3,6,7,8-HxCDF	ND		ND		ND	
1,2,3,7,8,9-HxCDF	ND		ND		ND	
2,3,4,6,7,8-HxCDF	ND<	3.17E-16		3.13E-17	ND<	1.58E-16
1,2,3,4,6,7,8-HpCDF		3.17E-16		1.56E-16	ND<	1.58E-16
1,2,3,4,7,8,9-HpCDF	ND		ND		ND	
OCDF	ND		ND		ND	
Total TCDF		3.33E-15		4.85E-15		7.45E-15
Total PeCDF		4.75E-16	ND<	1.25E-15	ND<	9.51E-16
Total HxCDF		5.07E-16		3.13E-17	ND<	1.58E-16
Total HpCDF		3.17E-16		1.56E-16	ND<	1.58E-16
Total PCDF		4.63E-15		5.04E-15		7.45E-15

ND = Not detected in sample train.

ND <= Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA:			
Test run number	1	2	3
Test location		INCINERATOR STACK	
Test date	06-10-93	06-11-93	06-12-93
Test time period	0745-1501	0710-1258	0756-1416
FURAN CONCENTRATIONS, ng/dscm			
2,3,7,8-TCDF	5.08E-06	5.01E-06	ND < 2.54E-06
1,2,3,7,8-PeCDF	ND	ND	ND
2,3,4,7,8-PeCDF	ND	ND	ND
1,2,3,4,7,8-HxCDF	5.08E-06	ND < 2.51E-06	ND < 2.03E-06
1,2,3,6,7,8-HxCDF	ND	ND	ND
1,2,3,7,8,9-HxCDF	ND	ND	ND
2,3,4,6,7,8-HxCDF	ND < 5.08E-06	5.01E-07	ND < 2.54E-06
1,2,3,4,6,7,8-HpCDF	5.08E-06	2.51E-06	ND < 2.54E-06
1,2,3,4,7,8,9-HpCDF	ND	ND	ND
OCDF	ND	ND	ND
Total TCDF	5.33E-05	7.77E-05	1.19E-04
Total PeCDF	7.62E-06	ND < 2.00E-05	ND < 1.52E-05
Total HxCDF	8.12E-06	5.01E-07	ND < 2.54E-06
Total HpCDF	5.08E-06	2.51E-06	ND < 2.54E-06
Total PCDF	7.41E-05	8.07E-05	1.19E-04
FURAN EMISSIONS, lb/hr			
2,3,7,8-TCDF	1.47E-10	1.49E-10	ND < 7.32E-11
1,2,3,7,8-PeCDF	ND	ND	ND
2,3,4,7,8-PeCDF	ND	ND	ND
1,2,3,4,7,8-HxCDF	1.47E-10	ND < 7.47E-11	ND < 5.85E-11
1,2,3,6,7,8-HxCDF	ND	ND	ND
1,2,3,7,8,9-HxCDF	ND	ND	ND
2,3,4,6,7,8-HxCDF	ND < 1.47E-10	1.49E-11	ND < 7.32E-11
1,2,3,4,6,7,8-HpCDF	1.47E-10	7.47E-11	ND < 7.32E-11
1,2,3,4,7,8,9-HpCDF	ND	ND	ND
OCDF	ND	ND	ND
Total TCDF	1.55E-09	2.32E-09	3.44E-09
Total PeCDF	2.21E-10	ND < 5.98E-10	ND < 4.39E-10
Total HxCDF	2.36E-10	1.49E-11	ND < 7.32E-11
Total HpCDF	1.47E-10	7.47E-11	ND < 7.32E-11
Total PCDF	2.15E-09	2.41E-09	3.44E-09

ND = Not detected in sample train.
ND < = Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA								
Test run number		1			2			3
Test location					INCINERATOR STACK			
Test date		06-10-93			06-11-93			06-12-93
Test time period		0745-1501			0710-1258			0756-1416
TOXICITY EQUIVALENCY EMISSIONS (I-TEFs/89), lb/hr								
2,3,7,8-TCDD	ND			ND			ND	
1,2,3,7,8-PeCDD	ND			ND			ND	
1,2,3,4,7,8-HxCDD	ND			ND			ND	
1,2,3,6,7,8-HxCDD	ND			ND			ND	
1,2,3,7,8,9-HxCDD	ND			ND			ND	
1,2,3,4,6,7,8-HpCDD		1.47E-12		ND <	1.49E-12			1.46E-12
OCDD		2.95E-13			2.24E-13			5.12E-13
Total TCDD		0.0			0.0			0.0
Total PeCDD		0.0			0.0			0.0
Total HxCDD		0.0			0.0			0.0
Total HpCDD		0.0			0.0			0.0
2,3,7,8-TCDF		1.47E-11			1.49E-11		ND <	7.32E-12
1,2,3,7,8-PeCDF	ND			ND			ND	
2,3,4,7,8-PeCDF	ND			ND			ND	
1,2,3,4,7,8-HxCDF		1.47E-11		ND <	7.47E-12		ND <	5.85E-12
1,2,3,6,7,8-HxCDF	ND			ND			ND	
1,2,3,7,8,9-HxCDF	ND			ND			ND	
2,3,4,6,7,8-HxCDF	ND <	1.47E-11			1.49E-12		ND <	7.32E-12
1,2,3,4,6,7,8-HpCDF		1.47E-12			7.47E-13		ND <	7.32E-13
1,2,3,4,7,8,9-HpCDF	ND			ND			ND	
1,2,3,4,6,7,8,9-OCDF	ND			ND			ND	
Total TCDF		0.0			0.0			0.0
Total PeCDF		0.0			0.0			0.0
Total HxCDF		0.0			0.0			0.0
Total HpCDF		0.0			0.0			0.0
TOTAL 2,3,7,8-TCDD EQUIVALENTS, lb/hr		3.27E-11			1.74E-11			1.98E-12

ND = Not detected in sample train.
ND < = Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-4 (cont)
SUMMARY OF DIOXIN AND FURAN TEST DATA AND TEST RESULTS

TEST DATA			
Test run number	1	2	3
Test location		INCINERATOR STACK	
Test date	06-10-93	06-11-93	06-12-93
Test time period	0745-1501	0710-1258	0756-1416
TOXICITY EQUIVALENCY EMISSIONS (I-TEFs/89), ug/dscm			
2,3,7,8-TCDD	ND	ND	ND
1,2,3,7,8-PeCDD	ND	ND	ND
1,2,3,4,7,8-HxCDD	ND	ND	ND
1,2,3,6,7,8-HxCDD	ND	ND	ND
1,2,3,7,8,9-HxCDD	ND	ND	ND
1,2,3,4,6,7,8-HpCDD	5.08E-08	ND < 5.01E-08	5.08E-08
1,2,3,4,6,7,8,9-OCDD	1.02E-08	7.52E-09	1.78E-08
Total TCDD	0.0	0.0	0.0
Total PeCDD	0.0	0.0	0.0
Total HxCDD	0.0	0.0	0.0
Total HpCDD	0.0	0.0	0.0
2,3,7,8-TCDF	5.08E-07	5.01E-07	ND < 2.54E-07
1,2,3,7,8-PeCDF	ND	ND	ND
2,3,4,7,8-PeCDF	ND	ND	ND
1,2,3,4,7,8-HxCDF	5.08E-07	ND < 2.51E-07	ND < 2.03E-07
1,2,3,6,7,8-HxCDF	ND	ND	ND
1,2,3,7,8,9-HxCDF	ND	ND	ND
2,3,4,6,7,8-HxCDF	ND < 5.08E-07	5.01E-08	ND < 2.54E-07
1,2,3,4,6,7,8-HpCDF	5.08E-08	2.51E-08	ND < 2.54E-08
1,2,3,4,7,8,9-HpCDF	ND	ND	ND
1,2,3,4,6,7,8,9-OCDF	ND	ND	ND
Total TCDF	0.0	0.0	0.0
Total PeCDF	0.0	0.0	0.0
Total HxCDF	0.0	0.0	0.0
Total HpCDF	0.0	0.0	0.0
TOTAL 2,3,7,8-TCDD EQUIVALENTS, ug/dscm	1.13E-06	5.84E-07	6.85E-08

ND = Not detected in sample train.
ND <= Either not detected in sample train and quantified in another test run, or test run values were less than blank train values and the detection limit is reported.

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TABLE 5-5
SUMMARY OF METALS TEST DATA AND TEST RESULTS

TEST DATA			
Test run number	1	2	3
Test location		INCINERATOR STACK	
Test date	06-10-93	06-11-93	06-12-93
Test time period	0745-1032	0710-0953	0756-1101
SAMPLING DATA			
Sampling duration, min.	120.0	120.0	120.0
Nozzle diameter, in.	0.375	0.375	0.375
Barometric pressure, in. Hg	24.79	24.57	24.62
Avg. orifice press. diff., in H_2O	1.75	1.70	1.77
Avg. dry gas meter temp., deg F	78.50	81.63	80.69
Avg. abs. dry gas meter temp., deg. R	539	542	541
Total liquid collected by train, ml	2735.0	2636.0	2526.0
Std. vol. of H_2O vapor coll., cu.ft.	128.7	124.1	118.9
Dry gas meter calibration factor	1.001	1.001	1.001
Sample vol. at meter cond., dcf	91.757	91.638	92.469
Sample vol. at std. cond., dscf (1)	74.974	73.777	74.742
Percent of isokinetic sampling	100.2	98.6	94.7
GAS STREAM COMPOSITION DATA			
CO_2, % by volume, dry basis	10.1	9.9	10.1
O_2, % by volume, dry basis	3.4	3.5	3.6
CO, % by volume, dry basis	0.0	0.0	0.0
N_2, % by volume, dry basis	86.5	86.6	86.4
Molecular wt. of dry gas, lb/lb mole	29.8	29.7	29.8
H_2O vapor in gas stream, prop. by vol.	0.632	0.627	0.614
Mole fraction of dry gas	0.368	0.373	0.386
Molecular wt. of wet gas, lb/lb mole	22.3	22.4	22.5
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA			
Cross sectional nozzle area, sq.ft.	0.000767	0.000767	0.000767
Static pressure, in. H_2O	-0.13	-0.15	-0.17
Static pressure, in. Hg	-0.010	-0.011	-0.013
Absolute pressure, in. Hg	24.78	24.56	24.61
Avg. temperature, deg. F	185	184	183
Avg. absolute temperature, deg.R	645	644	643
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	30	30	30
Avg. gas stream velocity, ft./sec.	54.3	54.0	54.9
Stack/duct cross sectional area, sq.ft.	9.62	9.62	9.62
Avg. gas stream volumetric flow, wacf/min.	31300	31200	31700
Avg. gas stream volumetric flow, dscf/min. (1)	7800	7800	8300

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 in Hg (760 mm Hg)

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TABLE 5-5 (cont)
SUMMARY OF METALS TEST DATA AND TEST RESULTS

TEST DATA								
Test run number		1			2			3
Test location					INCINERATOR STACK			
Test date		06-10-93			06-11-93			06-12-93
Test time period		0745-1032			0710-0953			0756-1101
METALS LABORATORY REPORT DATA, ug								
Antimony (Sb)		10.40			11.25			11.20
Arsenic (As)	ND <	40.30			11.40		ND <	40.30
Barium(Ba)	ND <	80.60			38.50		ND <	80.50
Beryllium(Be)	ND <	2.06		ND <	0.40		ND <	2.06
Cadmium (Cd)		1.65		ND <	1.96		ND <	2.06
Chromium (Cr)	ND <	4.00			2.83		ND <	4.00
Copper(Cu)		3808.80			4319.20			3666.00
Lead (Pb)		56.25			62.30			55.05
Mercury (Hg)		124.57			109.22			143.88
Nickel (Ni)	ND <	16.10			7.20		ND <	16.10
Selenium(Se)	ND <	40.30		ND <	22.20		ND <	40.30
Silver(Ag)		3.25		ND <	3.60		ND <	4.00
Thallium(Tl)	ND <	40.30		ND <	33.50		ND <	40.30
Vanadium(V)	ND <	20.10			2.35		ND <	20.10
Zinc(Zn)		522.20			981.65			1038.35
METALS CONCENTRATIONS, ug/m^3 (1)								
Antimony (Sb)		4.90			5.38			5.29
Arsenic (As)	ND <	18.98			5.46		ND <	19.04
Barium(Ba)	ND <	37.96			18.43		ND <	38.03
Beryllium(Be)	ND <	0.97		ND <	0.19		ND <	0.97
Cadmium (Cd)		0.78		ND <	0.94		ND <	0.97
Chromium (Cr)	ND <	1.88			1.35		ND <	1.89
Copper(Cu)		1793.85			2067.22			1731.95
Lead (Pb)		26.49			29.82			26.01
Mercury (Hg)		58.67			52.27			67.97
Nickel (Ni)	ND <	7.58			3.45		ND <	7.61
Selenium(Se)	ND <	18.98		ND <	10.63		ND <	19.04
Silver(Ag)		1.53		ND <	1.72		ND <	1.89
Thallium(Tl)	ND <	18.98		ND <	16.03		ND <	19.04
Vanadium(V)	ND <	9.47			1.12		ND <	9.50
Zinc(Zn)		245.94			469.83			490.55
METALS CONCENTRATIONS, lb/dscf (1)								
Antimony (Sb)		3.06E-10			3.36E-10			3.30E-10
Arsenic (As)	ND <	1.19E-09			3.41E-10		ND <	1.19E-09
Barium(Ba)	ND <	2.37E-09			1.15E-09		ND <	2.37E-09
Beryllium(Be)	ND <	6.06E-11		ND <	1.20E-11		ND <	6.08E-11
Cadmium (Cd)		4.85E-11		ND <	5.86E-11		ND <	6.08E-11
Chromium (Cr)	ND <	1.18E-10			8.46E-11		ND <	1.18E-10
Copper(Cu)		1.12E-07			1.29E-07			1.08E-07
Lead (Pb)		1.65E-09			1.86E-09			1.62E-09
Mercury (Hg)		3.66E-09			3.26E-09			4.24E-09
Nickel (Ni)	ND <	4.73E-10			2.15E-10		ND <	4.75E-10
Selenium(Se)	ND <	1.19E-09		ND <	6.63E-10		ND <	1.19E-09
Silver(Ag)		9.56E-11		ND <	1.08E-10		ND <	1.18E-10
Thallium(Tl)	ND <	1.19E-09		ND <	1.00E-09		ND <	1.19E-09
Vanadium(V)	ND <	5.91E-10			7.02E-11		ND <	5.93E-10
Zinc(Zn)		1.54E-08			2.93E-08			3.06E-08
METALS CONCENTRATIONS, lb/hr (1)								
Antimony (Sb)		1.44E-04			1.58E-04			1.64E-04
Arsenic (As)	ND <	5.56E-04			1.60E-04		ND <	5.89E-04
Barium(Ba)	ND <	1.11E-03			5.40E-04		ND <	1.18E-03
Beryllium(Be)	ND <	2.84E-05		ND <	5.61E-06		ND <	3.01E-05
Cadmium (Cd)		2.28E-05		ND <	2.75E-05		ND <	3.01E-05
Chromium (Cr)	ND <	5.52E-05			3.97E-05		ND <	5.84E-05
Copper(Cu)		5.26E-02			6.06E-02			5.35E-02
Lead (Pb)		7.76E-04			8.74E-04			8.04E-04
Mercury (Hg)		1.72E-03			1.53E-03			2.10E-03
Nickel (Ni)	ND <	2.22E-04			1.01E-04		ND <	2.35E-04
Selenium(Se)	ND <	5.56E-04		ND <	3.11E-04		ND <	5.89E-04
Silver(Ag)		4.49E-05		ND <	5.05E-05		ND <	5.84E-05
Thallium(Tl)	ND <	5.56E-04		ND <	4.70E-04		ND <	5.89E-04
Vanadium(V)	ND <	2.77E-04			3.30E-05		ND <	2.94E-04
Zinc(Zn)		7.21E-03			1.38E-02			1.52E-02

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 in Hg (760 mm Hg)

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TABLE 5-6
SUMMARY OF HEXAVALENT CHROMIUM TEST DATA AND TEST RESULTS

TEST DATA:				
Test run number	1	2		3
Test location		INCINERATOR STACK		
Test date	06-10-93	06-11-93		06-12-93
Test time period	1130-1552	1034-1341		1137-1440
SAMPLING DATA:				
Sampling duration, min.	120.0	120.0		120.0
Nozzle diameter, in.	0.354	0.354		0.354
Cross sectional nozzle area, sq.ft.	0.000683	0.000683		0.000683
Barometric pressure, in. Hg	24.79	24.57		24.62
Avg. orifice press. diff., in H_2O	1.27	1.32		1.33
Avg. dry gas meter temp., deg F	88	86		88
Avg. abs. dry gas meter temp., deg. R	548	546		548
Total liquid collected by train, ml	2313.0	2347.0		2297.0
Std. vol. of H_2O vapor coll., cu.ft.	108.9	110.5		108.1
Dry gas meter calibration factor	0.9923	1.0010		0.9923
Sample vol. at meter cond., dcf	79.721	80.888		82.397
Sample vol. at std. cond., dscf (1)	63.388	64.492		65.008
Percent of isokinetic sampling	102.4	98.4		100.0
GAS STREAM COMPOSITION DATA:				
CO_2, % by volume, dry basis	10.1	9.9		10.2
O_2, % by volume, dry basis	3.4	3.5		3.4
CO, % by volume, dry basis	0.0	0.0		0.0
N_2, % by volume, dry basis	86.5	86.6		86.4
Molecular wt. of dry gas, lb/lb mole	29.75	29.73		29.76
H_2O vapor in gas stream, prop. by vol.	0.632	0.631		0.625
Mole fraction of dry gas	0.368	0.369		0.375
Molecular wt. of wet gas, lb/lb mole	22.3	22.3		22.4
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:				
Static pressure, in. H_2O	-0.24	-0.20		-0.18
Static pressure, in. Hg	-0.018	-0.015		-0.013
Absolute pressure, in. Hg	24.77	24.56		24.61
Avg. temperature, deg. F	183	182		182
Avg. absolute temperature, deg.R	643	642		642
Pitot tube coefficient	0.84	0.84		0.84
Total number of traverse points	12	12		12
Avg. gas stream velocity, ft./sec.	50.3	53.6		52.0
Stack/duct cross sectional area, sq.ft.	9.62	9.62		9.62
Avg. gas stream volumetric flow, wacf/min.	29000	30900		30000
Avg. gas stream volumetric flow, dscf/min.	7300	7700		7600
LABORATORY REPORT:				
Total Cr^{+6} catch, ug	0.37 B	0.07 B	<	0.80 BC
HEXAVALENT CHROMIUM EMISSIONS:				
Concentration, ug/dscm	0.206	0.038	<	0.435
Mass rate, lbs/hr	5.61E-06	1.10E-06	<	1.24E-05

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg)
< = Not detected in sample train.
B = Detected in site blank: reported values have been blank corrected.
BC = Detected in site blank: test run values were less than site blank values: detection limit is reported.

Table 5-7

CO, CO_2, O_2, SO_2, NO_x, THC and HCl Emission Results

Parameter	Run #1	Run #2	Run #3	Average
Carbon Monoxide (1-hr rolling avg.)	49.5 ppm	47.4 ppm	57.6 ppm	51.5 ppm
Carbon Dioxide	10.14%	9.74%	10.29%	10.06%
Oxygen	3.37%	3.74%	3.40%	3.50%
Sulfur Dioxide	20.7 ppm	1.13 ppm	145 ppm	55.6 ppm
Nitrogen Oxides	119.2 ppm	142.0 ppm	130.7 ppm	130.6 ppm
Hydrogen Chloride	1.74 ppm	2.07 ppm	3.70 ppm	2.50 ppm
Total Hydrocarbons	5.53 ppm	9.61 ppm	5.06 ppm	6.73 ppm

Table 5-8

Summary of Analytical Results for Basin F Waste Feed (LF)

Parameter[a]	Run #1	Run #2	Run #3
Volatile Organics[b]			
• Chloromethane (ug/L)	1750	1,350	1,550
• Methylene Chloride (ug/L)	410 B[c]	41 B	82.5 B
• Acetone (ug/L)	3100 B[c]	2,700 B	4,000 B
• 2-Butanone (ug/L)	<250[d]	165	130 J
• Toluene (ug/L)	ND	<50[d]	<50[d]
• Dimethyldisulfide (ug/L)	<120[d]	18.5 J	32 J
Semivolatile Organics	ND	ND	ND
Pesticides			
• Mevinphos (ug/L)	ND	170	150
• Diazinon (ug/L)	ND	6.9	6.3
• Methyl Parathion (ug/L)	4.7	22	19
• Ronnel (ug/L)	4.6	4.3	3.6 J
• Fenthion (ug/L)	23	18	12
• Ethyl Parathion (ug/L)	ND	14	11
• Merphos (ug/L)	ND	3.8 J	37
• Azinphos Methyl (ug/L)	2.5 J	ND	ND
• Tokuthion (ug/L)	2.6	4.7	5.5
• Aldrin (ug/L)	55	52	89
• Dieldrin (ug/L)	51	45	86
• Endrin (ug/L)	48	42	72
• Endrin ketone (ug/L)	2.0	ND	2.9
Halides			
• Bromide (mg/L)	999	1,010	1,060
• Chloride (mg/L)	153,000	162,000	167,000
• Fluoride (mg/L)	2,220	2,500	2,450
Sulfate (mg/L)	18,000	18,500	19,300
Density (g/mL)	1.20	1.20	1.20
Heating Value	Sample did not ignite.		
Dioxins/Furans			
• 1234678-HpCDD (ppq)	ND	292	204
• OCDD (ppq)	ND	2,320	1,580
• 123478-HxCDF (ppq)	ND	ND	58.2
• 123678-HxCDF (ppq)	ND	ND	26.8
• 234678-HxCDF (ppq)	ND	90.3	(76.4)[e]
• 1234678-HpCDF (ppq)	ND	(120)[e]	213
• OCDF (ppq)	ND	326	766

Table 5-8

Summary of Analytical Results for Basin F Waste Feed (LF) (Continued)

Parameter[a]	Run #1	Run #2	Run #3
Dioxins/Furans (continued)			
• TOTAL TCDD (ppq)	ND	(80.6)[e]	ND
• TOTAL HpCDD (ppq)	ND	292	440
• TOTAL TCDF (ppq)	ND	(70.6)[e]	76.4
• TOTAL PeCDF (ppq)	519	273	112
• TOTAL HxCDF (ppq)	ND	88.1	143
• TOTAL HpCDF (ppq)	ND	(153)[e]	367
Metals			
• Antimony (mg/L)	ND	ND	ND
• Arsenic (mg/L)	3.1	2.5	2.6
• Barium (mg/L)	ND	ND	ND
• Beryllium (mg/L)	ND	ND	ND
• Cadmium (mg/L)	ND	ND	ND
• Chromium (mg/L)	1.5	1.7	ND
• Copper (mg/L)	3,420	3,550	64.9
• Lead (mg/L)	0.48	1.84	0.65
• Mercury (mg/L)	0.14	0.13	0.13
• Nickel (mg/L)	32.0	33.2	33.9
• Lead (mg/L)	0.36	ND	19.0
• Selenium (mg/L)	19.4	19.4	ND
• Silver (mg/L)	ND	ND	ND
• Thallium (mg/L)	ND	ND	ND
• Vanadium (mg/L)	1.2	ND	ND
• Zinc (mg/L)	26.6	22.6	21.9
Ash Content (%)	46.5	46.4	45.3
pH	6.2	6.0	6.1
Water Content (%)	65.4	64.8	63.5
Total Suspended Solids (mg/L)	25	144	95
Total Dissolved Solids (mg/L)	270,000	210,000	271,000

[a]Analytes not listed were reported as non-detects.
[b]Average reported value of two grab samples taken at beginning and end of each test run.
[c]The "B" flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.
[d]The average value for the two grab samples was less than the highest detection limit value.
[e]() indicates the estimated maximum possible concentration.

Table 5-9

Summary of Analytical Results for POHC Analysis

Parameter	Run #1	Run #2	Run #3
POHC - Chlorobenzene			
• Grab Sample 1	92%	94%	92%
• Grab Sample 2	94%	93%	92%
POHC - Carbon Tetrachloride			
• Grab Sample 1	95%	93%	91%
• Grab Sample 2	95%	73%*	93%

*A significant concentration of chlorobenzene was found in this analysis; sampling technique error suspected.

Table 5-10

Summary of Analytical Results for Makeup Water (MW)

Parameter[a]	Runs #1, 2, 3		
Volatile Organics	Run 1	Run 2	Run 3
• Methylene Chloride (ug/L)	13 B[c]	3 J	10 B
• Acetone (ug/L)	ND	ND	3 J
• Chloroform (ug/L)	30	41	32
• Bromodichloromethane (ug/L)	6	8	7
• Dibromochloromethane (ug/L)	0.7 J	ND	2 J
• Bromoform (ug/L)	0.7 J	ND	ND
Semivolatile Organics[b]			
• Di-n-Butylphthalate (ug/L)	1 JB		
• bis(2-Ethylhexyl)phthalate (ug/L)	1 JB		
Pesticides[b]	ND		
Dioxins/Furans[b]			
• OCDD (ppq)	(32.0)[d]		
• 123478-HxCDF (ppq)	(3.6)[d]		
• 123678-HxCDF (ppq)	2.6		
• 234678-HxCDF (ppq)	8.7		
• 1234678-HpCDF (ppq)	10.5		
• OCDF (ppq)	68.9		
• TOTAL TCDD (ppq)	(13.0)[d]		
• TOTAL HxCDF (ppq)	11.8		
• TOTAL HpCDF (ppq)	13.4		
Metals[b]			
• Antimony (ug/L)	ND		
• Arsenic (ug/L)	3.0		
• Barium (ug/L)	ND		
• Beryllium (ug/L)	1.9		
• Cadmium (ug/L)	ND		
• Chromium (ug/L)	ND		
• Copper (ug/L)	19.3		
• Lead (ug/L)	ND		
• Mercury (ug/L)	ND		
• Nickel (ug/L)	ND		
• Selenium (ug/L)	ND		
• Silver (ug/L)	ND		
• Thallium (ug/L)	ND		
• Vanadium (ug/L)	7.7		
• Zinc (ug/L)	55.2		
Total Halides[b]			
• Chloride (mg/L)	30.4		

[a]Analytes not listed were reported as non-detects.
[b]The three test runs were composited into one sample for analysis.
[c]The "B" flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.
[d]() indicates the estimated maximum possible concentration.

Table 5-11

Summary of Analytical Results for Caustic Solution (CS)

Parameter[a]	Runs #1,2,3[b]		
Volatile Organics	Run 1	Run 2	Run 3
• Methylene Chloride (ug/L)	160 B[c]	160 B	160 B
• Acetone (ug/L)	110 B[c]	91 J	63 J
Semivolatile Organics	ND		
Pesticides	ND		
Dioxins/Furans[d]			
• 123478-HxCDD (ppq)	(33.3)[d]		
• 123678-HxCDD (ppq)	(29.7)[d]		
• 123789-HxCDD (ppq)	(41.0)[d]		
• OCDD (ppq)	(94.4)[d]		
• 23478-PeCDF (ppq)	(29.3)[d]		
• 123478-HxCDF (ppq)	29.9		
• 123678-HxCDF (ppq)	(24.0)[d]		
• 234678-HxCDF (ppq)	70.4		
• 1234678-HpCDF (ppq)	28.6		
• TOTAL TCDD (ppq)	(75.8)[d]		
• TOTAL HxCDD (ppq)	(103)[d]		
• TOTAL PeCDF (ppq)	(29.6)[d]		
• TOTAL HxCDF (ppq)	95.6		
• TOTAL HpCDF (ppq)	36.7		
Metals			
• Antimony (ug/L)	69.9		
• Arsenic (ug/L)	645		
• Barium (ug/L)	14.3		
• Beryllium (ug/L)	3.8		
• Cadmium (ug/L)	ND		
• Chromium (ug/L)	66.8		
• Copper (ug/L)	10.6		
• Lead (ug/L)	12.5		
• Mercury (ug/L)	ND		
• Nickel (ug/L)	70.1		
• Selenium (ug/L)	ND		
• Silver (ug/L)	ND		
• Thallium (ug/L)	ND		
• Vanadium (ug/L)	208		
• Zinc (ug/L)	823		
Total Halides			
• Chloride (mg/L)	1,900		
• Fluoride (mg/L)	240		
Density (g/mL)	1.10		

[a]Analytes not listed were reported as non-detects.
[b]The three test runs were composited into one sample for analysis.
[c]The "B" flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.
[d]( ) indicates the estimated maximum possible concentration.

Table 5-12

Summary of Analytical Results for Brine (BR)

Parameter[a]	Run #1[b]	Run #2[b]	Run #3[b]
Volatile Organics			
• Methylene Chloride (ug/L)	11 B[c]	120 B[c]	17 J
Semivolatile Organics			
• Phenol (ug/L)	7 J	ND	ND
• Benzoic Acid (ug/L)	36 J	42 J	40 J
• Diethylphthalate (ug/L)	ND	1 J	3 J
• Pentachlorophenol (ug/L)	ND	2 J	ND
• Di-n-Butylphthalate (ug/L)	3 JB	3 JB	3 JB
• bis(2-Ethylhexyl)phthalate (ug/L)	ND	ND	2 J
Pesticides	ND	ND	ND
Dioxins/Furans	ND	ND	ND
Metals			
• Antimony (mg/L)	ND	ND	ND
• Arsenic (mg/L)	3.1	2.7	2.9
• Barium (mg/L)	ND	ND	ND
• Beryllium (mg/L)	0.10	ND	ND
• Cadmium (mg/L)	ND	ND	ND
• Chromium (mg/L)	1.8	2.0	2.1
• Copper (mg/L)	2,550	2,650	2,730
• Lead (mg/L)	0.67	1.12	ND
• Mercury (mg/L)	0.01	0.01	ND
• Nickel (mg/L)	24.8	25.6	26.7
• Selenium (mg/L)	0.22	ND	ND
• Silver (mg/L)	ND	ND	ND
• Thallium (mg/L)	ND	ND	ND
• Vanadium (mg/L)	1.1	ND	ND
• Zinc (mg/L)	25.1	17.7	17.8

Table 5-12

Summary of Analytical Results for Brine (BR) (Continued)

Parameter[a]	Run #1[b]	Run #2[b]	Run #3[b]
Total Halides			
• Bromide (mg/L)	1,040	970	983
• Chloride (mg/L)	131,000	131,000	140,000
• Fluoride (mg/L)	37.4	35.2	33.1
Density (g/mL)	1.20	1.20	1.20
pH	5.3	5.1	4.9
Total Suspended Solids (mg/L)	6,600	5,160	4,730
Total Dissolved Solids (mg/L)	269,000	287,000	199,000
Cyanide (ug/L)	ND	ND	ND
Sulfide (mg/L)	ND	ND	ND

[a]Analytes not listed were reported as non-detects.
[b]Average reported value of two grab samples taken at beginning and end of each test run.
[c]The "B" flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.
[d]The average value for the two grab samples was less than the highest detection limit value.
[e]ND: None Detected.

SECTION 6

QUALITY ASSURANCE SUMMARY

6.1 SUMMARY

Test data reviewed for this report represent Trial Burn samples collected 9-12 June 1993, and analyzed by Roy F. Weston Analytics Division, and Triangle Laboratories of RTP, Inc. (for dioxins/furans by method 8290). Analyses were logged and tracked by WESTON RFW batch assignment for the following analyses: Volatile Organic Sampling Train (VOST), volatiles (VOA), semivolatiles (BNA), chlorinated pesticides/PCBs (OCP), organophosphorus pesticides (OPP), total dioxins/furans (TDF), metals, and inorganics. Inorganics may include anions (bromide, chloride, fluoride, iodide, sulfate, sulfide), ammonia, cyanide, pH, BTU, density, HCl, and various solids analyses (particulates, %ash, %moisture, total dissolved solids, total and suspended solids). In summary:

RFW #	Sample Type	Analysis
9306L822	Stack Gas Audit	VOST
9306L857	Stack Gas	VOST
9306L858	Stack Gas	BNA, OCP, OPP
9306L859	Stack Gas, & Audit	Metals
9306L860	Liquid Waste	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L861	Makeup Water, Brine	VOA, BNA, OCP, OPP, TDF, Inorganics, Metals
9306L862	Stack Gas	BNA, OCP, OPP
9306L863	Stack Gas	Metals
9306L864	Stack Gas	HCl, Particulates
9306L865	Caustic Solution	VOA
9306L866	Stack Gas	VOST
9306L885	Stack Gas	VOST
9306L901	Liquid Waste	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L902	Brine	VOA, BNA, OCP, OPP, TDF, Inorganics, Metals

RFW #	Sample Type	Analysis
9306L903	Makeup Water	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L904	Caustic Solution	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L905	Stack Gas	BNA, OCP, OPP
9306L906	Stack Gas	HCl, Particulates
9306L907	Stack Gas	Metals
9306L909	Brine PE	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L910	Liquid Waste PE	VOA, BNA, OCP, OPP, Inorganics, Metals
9306L926	Stack Gas	POHC
none[1,2]. subbed to Triangle	Caustic Solution, Liquid Waste, Makeup Water	TDF by Method 8290

[1]Corresponds to liquid feed samples received at WESTON from the following RFW Batches: 9306L860, 9306L861, 9306L901, 9306L903, 9306L904.

[2]TDF analysis of the stack gases by Method 23 was subbed under separate contract to Triangle Laboratories. These results are not evaluated in this QA Summary.

6.1.1 Document Authority for Criteria

Test data in support of the RMA-SQI Trial Burn were reviewed for conformance to project analytical requirements and data quality objectives (DQOs). Required methods, analyte lists, preservation and holding times are presented in Sections 1.4, 5, 6.4-6.13, 8, 11 of the project Trial Burn Plan, Volume I, September 1992. A memo dated 10 June 1993 regarding analysis of the brine samples for dioxins/furans analysis by method 8280 outlines four items of method clarification. These items with respect to analyte list, number of replicates to be used for the multi-point calibration curve, reporting limit, and surrogate list were approved prior to sample analysis of the brines, and were considered as amended to the Trial Burn Plan for the purpose of this QA summary evaluation.

DQOs for precision, accuracy, and completeness are presented in Section 11 of the project Trial Burn Plan and Section 2.4 of the project Chemical Data Acquisition Plan (CDAP), October 1992.

- For convenience, precision and accuracy DQOs are provided in Tables 6-1 through 6-9 of this report.

- The project QA objective for laboratory completeness is to have 95% of the method control data within control criteria. The laboratory completeness goal was met for both the stack gases as a stand alone entity, and the project overall. For this Trial Burn, 95% of the control QC sample results associated with the stack gas samples were within the accuracy and precision goals stated in Tables 6-1 through 6-9; and 98% of the control QC sample results associated with the entire project met QC criteria. QC goals by parameter group are addressed in subsequent sections of this report. The ability to meet or exceed completeness objectives is dependent on the nature of samples submitted for analysis. For example, the analytical methods proposed for use (particularly for organics analyses) are intended for analysis of environmental samples of low and medium concentrations. The applicability of these methods to the RMA-SQI non-routine matrices such as stack gases, Basin F liquids, makeup water, brines and caustic solution may result in poor method performance and therefore adversely impact achievement of the data completeness goal.

  Project specific completeness goals account for all aspects of sample handling, from collection through data reporting. The level of completeness can be affected by loss or breakage of samples during transport, as well as external problems which prohibit collection of the sample. The project QA objective for overall completeness is to have no less than 80% of the data usable without qualification. The project completeness goals was met for both the stack gases as a stand alone entity, and the project overall. A total of 97% of the method and matrix QC precision and accuracy data associated with the stack gases is within QC control limits. A total of 93% of the method and matrix QC precision and accuracy data associated with the entire project is within QC control limits.

6.2 METHODS, ANALYTE LISTS, PRESERVATION AND HOLDING TIMES

6.2.1 Analytical Methods

A summary of the analytical methods employed during the Trial Burn is provided in Table 4-1. The methods used are in 100% conformance to the objectives stated in the Trial Burn Plan.

6.2.2 Analyte Lists

A summary of the analytical parameters specified in the Trial Burn Plan is provided in Tables 4-3 through A-8, which provides a listing of the analytes in the following requested parameter groups: volatile organic compounds, semivolatile organic compounds, pesticides/ PCBs (both organochlorine pesticides and organophosphate pesticides), dioxins/furans, metals, and total halides. Chlorobenzene is listed in the Trial Burn Plan (TBP) as a target analyte for both VOA and BNA. EPA methods recommend this compound be analyzed as a purgeable (VOA) and list it as a target analyte for VOA. Data are reported for this compound as a VOA. A total of 100% of the requested analytes was reported.

6.2.3 Sample Preservation

Sample preservation is discussed in Section 2.3.2 of this Trial Burn Report.

6.2.4 Holding Times

Holding times were evaluated from time of collection to time of preparation, and from time of preparation to time of analysis. In some instances (e.g., VOA or halide analysis), the preparation date is the same as the analysis date. TBP holding times were met for the initial analysis of 100% of the samples for all parameters except dioxins/furans analyzed by method 8290.

EPA method holding times were met for all dioxins/furans extractions, analyses and re-analyses; and are useable without qualification according to the EPA published methods. For SW-846, both method 8280 and 8290 indicate a holding time of 30 days to extraction and 45 days to complete analysis. However, the TBP holding time from collection to extraction for analyses by method 8290 all exceeded the TBP-specified 7 days to extraction by 9-11 days.

A summary of holding time criteria checks follow:

Analysis:	Holding Time Criteria Evaluation:
VOST	all matrices analyzed within 14 days of collection
VOA	all matrices within 7 days of collection when not acid-preserved, and within 14 days of collection when acid-preserved with HCl
BNA	all matrices extracted/analyzed within TBP specification (7 days to extraction, 40 days for analysis of extract)
OCP	all matrices extracted/analyzed within TBP specification (7 days to extraction, 40 days for analysis of extract)
OPP	initial analysis for all matrices extracted/analyzed within TBP specification (7 days to extraction, 40 days for analysis of extract) Brines: 2 of 3 brines required re-extraction due to low surrogate recoveries. This re-extraction was one day past hold, and should not prevent use of the data. Makeup Water: 1 makeup water sample required re-extraction due to low surrogate recoveries. This re-extraction was one day past hold, and should not prevent use of the data.

Analysis:	Holding Time Criteria Evaluation:
TDF	Stack Gases: not evaluated Brines: all 4 samples were initially extracted/analyzed within TBP specification for method 8280 analyses (7 days to extraction, 40 days for analysis of extract). 1 sample required re-extraction due to low internal standard recovery. This re-extraction was 5 days past hold[1]. Liquid Feed Samples: (caustic solution, liquid waste, makeup water) all 6 samples exceeded the TBP extraction holding time for method 8290 (7 days to extraction, 40 days for analysis of extract)[1] [1]Note: all evaluated samples and re-extractions were extracted and analyzed within the EPA SW-846 method recommendation of 30 days from collection for extraction and 45 days from collection to complete analysis.
Inorganics	all matrices prepped/analyzed within TBP specification
Metals	all matrices digested/analyzed within TBP specification (28 days to preparation for Hg, 180 days for other metals)

6.3 PRECISION AND ACCURACY DQOs

6.3.1 Variance from TBP-Specified Criteria

6.3.1.1 VOST

DQOs for VOST analysis are not specified in the TBP. For this review, a 50-150% recovery window was used to evaluate surrogate performance. 100% of all analyses met this criteria.

6.3.1.2 OPP Surrogate/Matrix Spike Components

For OPP, the TBP-specified list of surrogate and target spiking compounds was changed. With respect to the Trial Burn objective to determine absence/presence of organophosphorus pesticides (OPPs) in Basin F Liquids, **no adverse affect to useability is**

presented by use of the alternate list of spiking compounds for surrogate and matrix spike analysis. The target compound list for this project, with the compounds presented in order of elution on the primary analysis column, is shown in Table A. Historical data for the Basin F liquid shows no previous history of OPPs (Trial Burn Plan, Table 1-1). With no site-specific compounds of interest, selection of the spiking solution components for presentation in the TBP was based on operating practices in the Analytics Division at the time the TBP was initially drafted. Since that time the components of the spiking solution have been changed, providing:

- A greater number of compounds (8 versus 5) as indicators of QC performance.
- A QC check at approximately five minute intervals over the chromatographic run for more frequent indication of performance throughout the run.
- Good separation to allow for positive identification, i.e., minimized co-elution and interferences.

Table A

RT TBP List	RT Lab List	RMA Trial Burn Surrogate and Target OPP Compound List:
	2.01	Dichlorvos
4.28		Mevinphos
8.40		Ethoprop
		Naled
		Phorate
		Demeton,O
	10.48	Demeton,S
	11.02	Atrazine
12.38		Diazinon
		Disulfoton
14.25	14.25	Methyl Parathion
		Ronnel
		Malathion
	16.45	Fenthion
		Chlorpyrifos
		Ethyl Parathion
		Trichloronate
		Merphos
		Supona
		Stirophos
	20.42	Tokuthion
	22.32	Fensulfothion
	22.88	Ethion (surrogate)
		Bolstar
28.13	28.13	Azinphos methyl
		Coumaphos

(If all OPP target compounds were present in a single sample, they would overlap, and inhibit or prevent correct compound identification. For calibration, three separate mixes are required in order to adequately separate all target compounds for identification and quantification).

The retention times of the compounds specified for spiking in the Trial Burn Plan, as well as those actually used for spiking, are provided in Table A, to show the greater coverage provided by the spiking mix used over the full run time of approximately 35 minutes.

6.3.1.3 OPP Control Limits

Control limits used to evaluate the surrogate ethion were the same as those listed for the TBP-specified surrogate triphenylphosphate: 40-140% recovery. Control limits for the target compounds methyl parathion and methyl azinphos were obtained from the TBP. For other spiked target compounds not addressed in the TBP, a 50-150% recovery window and 30% RPD were used to evaluate target compound performance. These criteria are equivalent to, or in most instances are more stringent than, the limits provided for the compounds specified in the TBP. Tables 6-5 and 6-6 show these spiking compounds and criteria.

6.3.1.4 Stack Gas Extractables: Sample Prep

In order to maintain the desired project detection limits, a single limited-volume extract was obtained for all organic extractables (BNA, OCP, and OPP). This precluded addition of OPP surrogates and spikes due to co-elution with OCP surrogates and target analytes, therefore, 12 of the 48 analyses have no recovery data available for OPP. The corresponding OCP recoveries for the composites provide information on general extraction efficiency and recovery for these batches. The respective RFW numbers are:

9306L858-009	TBURN-SB-WATER
9306L858-010	COMP FH RN1
9306L858-011	COMP BH RN1
9306L858-012	COMP FH SB

6.3.2 Stack Gas Analyses

Stack gas samples were collected for VOST, BNA, OCP, OPP, metals, HCl, and particulates in three separate test burns over three consecutive days, 10, 11, and 12 June 1993. On 9 June, a VOST audit sample was collected, and on 10 June a multi-metals audit sample was collected. Evaluation of QC indicators analyzed concurrent to these audit samples is included in this QC Summary. Results of audit samples are discussed in Section 7.2.

Test	Number of Samples	Method QC: % of total meeting QC criteria	Sample QC: % of total meeting QC criteria
VOST	A total of 67 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for VOST.	100% of 91 results met QC precision and accuracy criteria	99% of 156 recoveries met QC precision and accuracy criteria
BNA	A total of 8 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for BNA.	93% of 102 results met QC precision and accuracy criteria	100% of 66 results met QC precision and accuracy criteria
OCP	A total of 8 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for OCP.	89% of 45 results met QC precision and accuracy criteria	100% of 20 results met QC precision and accuracy criteria
OPP	A total of 8 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for OPP.	Due to the nature of the sample preparation, OPP QC indicators could not be analyzed. Samples were extracted concurrently with OCP, refer to OCP results for QC performance.	
metals	A total of 11 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for metals.	96% of 48 results met QC precision and accuracy criteria	Only mercury was spiked. 100% of the 5 obtainable results met QC precision and accuracy criteria (4 MS recoveries were unusable due to the high concentration of mercury in the unspiked samples)
HCl, part	A total of 13 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for HCl and particulates.	100% of 4 results met QC precision and accuracy criteria	100% of 7 results met QC precision and accuracy criteria

6.3.3 Liquid Feed Samples and Brines

For purpose of this report, liquid feed samples include caustic solution, liquid waste, and makeup water. Liquid feed and brine samples were collected for VOA, BNA, OCP, OPP, TDF, metals, and inorganics on three separate test burns over three consecutive days, 10, 11, and 12 June 1993. On 11 June, PE samples characteristic of the liquid waste feed and of the brine were collected concurrently with the Trial Burn samples. Evaluation of QC indicators analyzed concurrent to these audit samples is included in this QC Summary. Results of audit samples are discussed in Section 7.2. In the following summary table, results of laboratory control samples analyzed concurrently with the stack gas samples are not repeated in the totals formatted QC.

Test	Number of Samples	Method QC: % of total meeting QC criteria	Sample QC: % of total meeting QC criteria
VOA	A total of 20 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for VOA.	100% of 36 results met QC precision and accuracy criteria	96% of 196 results met QC precision and accuracy criteria
BNA	A total of 8 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for BNA.	95% of 74 results met QC precision and accuracy criteria	77% of 174 obtainable results met QC precision and accuracy criteria
OCP	A total of 11 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for OCP.	95% of 44 results met QC precision and accuracy criteria	84% of 70 obtainable results met QC precision and accuracy criteria
OPP	A total of 11 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for OPP.	96% of 74 results met QC precision and accuracy criteria	63% of 85 obtainable results met QC precision and accuracy criteria
metals	A total of 11 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for metals.	100% of 359 results met QC precision and accuracy criteria	90% of 469 obtainable results met QC precision and accuracy criteria
Inorg	A total of 78 investigative samples (including blank train and site blank samples), plus associated quality control checks, were analyzed for inorganics	100% of 73 results met QC precision and accuracy criteria	93% of 100 results met QC precision and accuracy criteria

6.3.4 Blank Analysis

Methylene chloride was reported above the laboratory reporting limit in some VOST/VOA method blanks and trip blanks; however, contamination levels are all less than three times the reporting limit for this common laboratory solvent.

Laboratory blanks for BNA, OCP, OPP and TDF showed no contamination at or above the reporting limit.

For metals analyses, the method blank for silicon associated with the stack gas samples showed elevated levels of analyte (>9,000 ug) above the laboratory reporting limit. Most hits in the samples were of significant enough levels that this blank contamination had no impact; however, results for samples 9306L859-003 (MMTL-RN1-BHN @ 1,850 ug) and 9306L863-003 (MMTL-RN2-BHN @ 89,500 ug) should be examined as potential for false positives. All other method blanks were reported at levels less than the reporting level, although quantities between the instrument detection limit (IDL) and reporting limit were reported in some blanks for arsenic, boron, calcium, lead, selenium, silicon, thallium, vanadium and zinc.

All method blanks for inorganics showed no contamination at or above the reporting limit.

6.4 COMPLETENESS

Review of reported analytes against requirements of the TBP showed the following:

Analysis:	Analysis of Requested Analytes Criteria Evaluation:
VOST/VOA	• all specified analytes reported
BNA	• chlorobenzene was not reported with BNA; however, was reported with the VOST and VOA results
OCP	• all specified analytes reported
OPP	• all specified analytes reported • surrogate and target compounds for spiking were not as specified in the TBP, however, the substituted compounds provide a larger number of compounds for evaluation than originally specified (refer to Sections 6.3.1.2)
TDF	• all specified isomers reported in method 8290 • totals are reported for each congener group in method 8280
Inorganics	• analytes with TBP specified DQOs were not applicable to this Trial Burn data set; however, all analytes specified on the chain of custody were reported
Metals	• all specified analytes reported

The laboratory completeness goal of 95% and project completeness goal of 80% with respect to precision and accuracy DQOs were met. For the stack gases the laboratory completeness (based on control QC sample results) and project completeness (based on control QC and matrix QC results) were 95% and 97%, respectively. For the overall project (stack gas samples and other matrix samples), laboratory and project completeness assessment were 98% and 93%, respectively.

Table 6-1

Water Surrogate Recovery Limits - VOA

Fraction	Surrogate Compound	% Recovery Limits
VOA	Toluene-d_8	81-117
VOA	4-Bromofluorobenzene	74-121
VOA	1,2-Dichloroethane-d_4	70-121

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-2

Water Matrix Spike Recovery Limits - VOA

Fraction	Matrix Spike Compound	% Recovery Limits	Relative % Difference
VOA	1,1-Dichloroethene	61-145	14
VOA	Trichloroethene	71-120	14
VOA	Chlorobenzene	75-130	13
VOA	Toluene	76-125	13
VOA	Benzene	76-127	11

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-3

Water Surrogate Recovery Limits - BNA/Acids

Fraction	Surrogate Compound	% Recovery Limits
BNA	Nitrobenzene-d_5	35-114
BNA	2-Fluorobiphenyl	43-116
BNA	p-Terphenyl-d_{14}	33-141
BNA	Phenol-d_5	10-94
BNA	2-Fluorophenol	21-100
BNA	2,4,6-Tribromophenol	10-123

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-4

Water Matrix Spike Recovery Limits - BNA/Acids

Fraction	Matrix Spike Compound	% Recovery Limits	Relative % Difference
BN	1,2,4-Trichlorobenzene	39-98	28
BN	Acenaphthene	46-118	31
BN	2,4-Dinitrotoluene	24-96	38
BN	Pyrene	26-127	31
BN	N-Nitroso-Di-n-Propylamine	41-116	38
BN	1,4-Dichlorobenzene	36-97	28
Acid	Pentachlorophenol	9-103	50
Acid	Phenol	12-110	42
Acid	2-Chlorophenol	27-123	40
Acid	4-Chloro-3-Methylphenol	23-97	42
Acid	4-Nitrophenol	10-80	50

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-5

Water Surrogate Recovery Limits - Pesticides

Fraction	Surrogate Compound	% Recovery Limits
Pesticide (organochlorine)	Dibutylchlorendate	24-154
Pesticide (organophosphorous)	Ethion	40-140

Note: This table shows the selected compound used for QA/QC accuracy and precision control. Selected compound is consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-6

Water Matrix Spike Recovery Limits - Pesticides

Fraction	Matrix Spike Compound	% Recovery Limits	Relative % Difference
Pesticide (organochlorine)	Lindane	56-123	15
Pesticide (organochlorine)	Heptachlor	40-131	20
Pesticide (organochlorine)	Aldrin	40-120	22
Pesticide (organochlorine)	Dieldrin	52-126	18
Pesticide (organochlorine)	Endrin	56-121	21
Pesticide (organochlorine)	4,4-DDT	38-127	27
Pesticide (organophosphorous)	Dichlorous	50-150	30
Pesticide (organophosphorous)	Demeton-s	50-150	30
Pesticide (organophosphorous)	Methyl parathion	52-172	30
Pesticide (organophosphorous)	Atrazine	50-150	30
Pesticide (organophosphorous)	Fenthion	50-150	30
Pesticide (organophosphorous)	Tokuthion	50-150	30
Pesticide (organophosphorous)	Fensulfothion	50-150	30
Pesticide (organophosphorous)	Methyl azinphos	54-138	25

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance based and have been adopted from the referenced SOW.

Table 6-7

Water Surrogate Recovery Limits - Dioxins/Furans

Fraction	Surrogate Compound	% Recovery Limits
Dioxin	2,3,7,8- TCDD - C_{13}	40-120
Dioxin	1,2,3,6,7,8-HCDD - C_{13}	40-120
Dioxin	1,2,3,6,7,8-OCDD - C_{13}	40-120
Dioxin	1,2,3,4,7,8- HxCDD - C_{13}	40-120
Furan	2,3,1,7,8- PeCDF - C_{13}	40-120
Furan	1,2,3,4,7,8- HxCDF - C_{13}	40-120
Furan	1,2,3,4,7,8,9- HpCDF - C_{13}	40-120

Note: These analyses will be performed by a subcontractor.

Table 6-8

Water Matrix Spike Recovery Limits - Dioxins/Furans

Fraction	Matrix Spike Compound	% Recovery Limits
Dioxin	2,3,7,8-TCDD	60-140
Dioxin	1,2,3,6,7,8-HCDD	60-140
Dioxin	1,2,3,6,7,8-OCDD	60-140
Furan	2,3,7,8-TCDF	60-140
Furan	1,2,3,6,7,8-HCDF	60-140
Furan	1,2,3,6,7,8-OCDF	60-140

Note: These analyses will be performed by a subcontractor.

Table 6-9

Water Matrix Spike Recovery Limits - Inorganics

Matrix Spike Compound		% Recovery Limits	Relative % Difference
Metals -	Arsenic, barium, beryllium, cadmium, chromium, lead, thallium, and mercury	75-125	20
	Antimony	40-160	20
	Silver	60-140	35
Sulfur		70-130	30
Ammonia		70-130	30
Total halides		70-130	30

Note: This list includes selected compounds used for QA/QC accuracy and precision control in the groups (fractions) of analytes shown. Selected compounds are consistent with guidance presented in the U.S. EPA SW-846, 3rd edition, and/or the U.S. Contract Laboratory Program (CLP) Statement of Work (SOW 2/88). Stated control limits are performance-based and have been adopted from the referenced SOW.

SECTION 7
VISITS AND AUDIT SUMMARY

7.1 VISITORS LIST

This section includes a list of personnel from the various oversight and state agencies and their designated subcontractors who were present at RMA to observe and monitor the Trial Burn test program. The individuals listed were present during part or all of the Trial Burn test days 10-12 June 1993.

EPA:	Carl Daly, Larry Diede, Brent Truskowski
Entropy:	David Brintle
CDH:	Celia Van Derloop, Lynn Olson
CDM:	Tim McCandless, Kelly Velasquez
ITO:	George Hritz

7.2 AUDIT SUMMARY

EPA, in conjunction with their oversight responsibilities for cleanup efforts performed by the Army and their subcontractors at the RMA, observed all activities associated with the Trial Burn program, including an audit of the analytical methods used by the WESTON laboratory. Two Performance Evaluation (PE) samples were prepared and submitted to the Lionville laboratory for analysis. One PE sample was characteristic of the liquid waste feed and the other sample was characteristic of the brine. A summary of the analytical results for the liquid waste feed and brine is located in Tables 7-1 and 7-2, respectively.

Stack audit samples for the volatile organic sampling train (VOST), dioxins/furans and multi-metals were also received from EPA and analyzed. The dioxin/furan analysis of the SQI stack samples by EPA Method 23 procedures was performed by Triangle Laboratories, located in Durham, North Carolina. Summaries of the test results for VOST, dioxins/furans and multi-metals are located in Tables 7-3, 7-4, and 7-5, respectively.

Procedural checklists used by the Stack Team while sampling are provided in Appendix B.1.2, and calibration data sheets for sampling equipment are provided in Appendix B.1.3.

Table 7-1

Summary of Audit Results for Liquid Waste Feed (LF)

Parameter	Results
Volatile Organics	
• Chloromethane (ug/L)	8,900
• Methylene Chloride (ug/L)	350 B
• 1,1-Dichloroethene (ug/L)	310
• 1,2-Dichloroethene (ug/L)	260
• Chloroform (ug/L)	150
• 1,2-Dichloroethane (ug/L)	230
• 1,1,1-Trichloroethane (ug/L)	260
• Carbon Tetrachloride (ug/L)	80 J
• Bromodichloromethane (ug/L)	160
• Trichloroethene (ug/L)	200
• Dibromochloromethane (ug/L)	190
• Benzene (ug/L)	190
• Bromoform (ug/L)	110 J
• Tetrachloroethene (ug/L)	130
• Toluene (ug/L)	61 J
• Chlorobenzene (ug/L)	59 J
• Ethylbenzene (ug/L)	250
• Xylene (ug/L)	160
Semivolatile Organics	
• Phenol (ug/L)	78
• 2-Chlorophenol (ug/L)	22
• 2-Methylphenol (ug/L)	31
• 2,4-Dimethylphenol (ug/L)	43
• 2,4,6-Trichlorophenol (ug/L)	100
• Pentachlorophenol (ug/L)	67
• Di-n-Butylphthalate (ug/L)	1 JB

Notes:

"J" — Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level (e.g., if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

"B" —This flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.

Table 7-1

Summary of Audit Results for Liquid Waste Feed (LF) (Continued)

Parameter	Results
Pesticides	
• Beta-BHC (ug/L)	1.3
• gamma-BHC (Lindane) (ug/L)	12
• Heptachlor (ug/L)	2.0
• Aldrin (ug/L)	6.8
• Dieldrin (ug/L)	5.6
• 4,4-DDE (ug/L)	2.7
• Endrin (ug/L)	3.8
• 4,4-DDD (ug/L)	5.8
• 4,4-DDT (ug/L)	7.2
• alpha-Chlordane (ug/L)	8.8
Metals	
• Silver (mg/L)	5.6
• Boron (mg/L)	1.8
• Calcium (mg/L)	5.0
• Copper (mg/L)	281
• Mercury (mg/L)	0.0001
• Nickel (mg/L)	20.9
• Silicon (mg/L)	3.4
• Zinc (mg/L)	3.1
Halides	
• Bromide (mg/L)	ND
• Chloride (mg/L)	135,000
• Fluoride (mg/L)	214
• Iodide (mg/L)	ND

Table 7-2

Summary of Audit Results for Brine

Parameter	Results
Volatile Organics	
• Vinyl Chloride (ug/L)	33
• Methylene Chloride (ug/L)	36 B
• Acetone (ug/L)	9 JB
• 1,1-Dichloroethene (ug/L)	110
• 1,2-Dichloroethene (ug/L)	69
• 1,2-Dichloroethane (ug/L)	86
• 1,1,1-Trichloroethane (ug/L)	130
• Carbon Tetrachloride (ug/L)	51
• 1,2-Dichloropropane (ug/L)	73
• Trichloroethene (ug/L)	22
• 1,1,2-Trichloroethane (ug/L)	42
• Benzene (ug/L)	25
• Tetrachloroethene (ug/L)	21
• Toluene (ug/L)	48
• Chlorobenzene (ug/L)	72
• Ethylbenzene (ug/L)	31
• Styrene (ug/L)	54
• Xylene (ug/L)	160
Semivolatile Organics	
• 2-Methylphenol (ug/L)	28
• 2-Nitrophenol (ug/L)	92
• 2,4,6-Trichlorophenol (ug/L)	56
• 2,4,5-Trichlorophenol (ug/L)	62
• Pentachlorophenol (ug/L)	150
Total Halides	
• Bromide (mg/L)	321
• Chloride (mg/L)	ND
• Fluoride (mg/L)	ND
• Iodide (mg/L)	ND
Pesticides	
• Alpha-BHC (ug/L)	2.0
• Beta-BHC (ug/L)	1.6
• Heptachlor (ug/L)	0.3
• Aldrin (ug/L)	1.2
• Heptachlor Epoxide (ug/L)	3.2
• Dieldrin (ug/L)	0.33
• 4,4-DDE (ug/L)	2.4
• Endrin (ug/L)	3.6
• 4,4-DDD (ug/L)	2.1
• gamma-Chlordane (ug/L)	2.2

Table 7-2

Summary of Audit Results for Brine (Continued)

Parameter	Results
Metals	
• Aluminum (mg/L)	6.6
• Arsenic (mg/L)	0.23
• Boron (mg/L)	4.9
• Calcium (mg/L)	16.7
• Copper (mg/L)	1.2
• Manganese (mg/L)	0.61
• Silicon (mg/L)	6.4
• Zinc (mg/L)	0.95
Ammonia (mg/L)	29.4
Cyanide (ug/L)	417
Sulfide (mg/L)	ND

Notes:

"J" — Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level (e.g., if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

"B" — This flag is used when the analyte is found in the associated blank and in the sample. It indicates possible/probable laboratory blank contamination.

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TABLE 7-3
SUMMARY OF EPA AUDIT FOR VOLATILE ORGANICS
TEST DATA AND POSITIVE TEST RESULTS

TEST DATA:					
Cylinder number	567	567	567	567	567
Test date	06-09-93	06-09-93	06-09-93	06-09-93	AVERAGE
Test time	1143-1153	1212-1222	1235-1245	1302-1312	
Test tube pair	1	2	3	4	
SAMPLING DATA:					
Duration, minutes	10.00	10.00	10.00	10.00	
Average dry gas meter press. in. H_2O	1.35	1.30	1.30	1.30	
Average meter temp. deg. C	22.25	26.25	28.00	29.25	
Average absolute meter temp. deg. R	532.05	539.25	542.40	544.65	
Actual sample volume, liters	9.680	9.312	9.454	9.230	
Meter box calibration, Y	0.996	0.996	0.996	0.996	
Barometric pressure, in. Hg	24.74	24.74	24.74	24.74	
Sample volume, dscf	0.2805	0.2662	0.2687	0.2612	
VOST EMISSIONS (ppb/v):					
Chloromethane	5.2	17.1	5.6	0.0	7.0
Bromomethane	0.0	0.2	0.0	0.3	0.1
Vinyl Chloride	25.7	26.8	20.7	33.7	26.7
Chloroform	33.0	32.5	32.7	33.5	32.9
Carbon Tetrachloride	11.1	10.5	10.4	10.8	10.7
Benzene	32.2	30.2	31.2	32.1	31.4
Tetrachloroethane	9.9	9.6	9.9	10.6	10.0
Toluene	6.7	2.0	0.6	0.5	2.4

NOTE: Complete volatile analyte listing can be found in Table 4-3.

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TABLE 7-3 (cont.)
SUMMARY OF EPA AUDIT FOR VOLATILE ORGANICS
TEST DATA AND POSITIVE TEST RESULTS

TEST DATA:					
Cylinder number	568	568	568	568	568
Test date	06-09-93	06-09-93	06-09-93	06-09-93	AVERAGE
Test time	1332-1342	1354-1404	1446-1456	1508-1518	
Test tube pair	1	2	3	4	
SAMPLING DATA:					
Duration, minutes	10.00	10.00	10.00	10.00	
Average dry gas meter press. in. H_2O	1.30	1.30	1.30	1.30	
Average meter temp. deg. C	30.25	31.00	29.00	29.00	
Average absolute meter temp. deg. R	546.45	547.80	544.20	544.20	
Actual sample volume, liters	9.267	9.570	9.455	9.225	
Meter box calibration, Y	0.996	0.996	0.996	0.996	
Barometric pressure, in. Hg	24.74	24.74	24.74	24.74	
Sample volume, dscf	0.2614	0.2693	0.2678	0.2613	
VOST EMISSIONS (ppb/v):					
Chloromethane	13.5	11.9	9.4	24.5	14.8
Vinyl Chloride	1.0	0.0	0.0	0.4	0.4
Carbon Disulfide	0.7	14.9	6.3	13.7	8.9
1,1-Dichloroethene	10.4	10.4	10.6	11.5	10.7
Toluene	10.9	11.0	10.7	10.9	10.9
Chlorobenzene	10.4	10.9	11.0	11.0	10.8

NOTE: Complete volatile analyte listing can be found in Table 4-3.

TABLE 7-4

U.S. EPA QUALITY ASSURANCE DIVISION
DIOXIN/FURAN AUDIT DATA

AUDITEE COMPANY Triangle Laboratories of RTP
ADDRESS 801 Capitola Inc.
Durham, NC 27713
AUDIT SAMPLE NO. 1156
DATA AUDIT SAMPLE RECEIVED 6/12/93
DATE ANALYZED 6/27/93
CONFIRMATION ANALYSIS USED: YES 2378-TCDF NO
AUDITEE'S NAME Don Harvan

COMPOUND	AUDITEE RESULTS (ng sample)	COMPOUND	AUDITEE RESULT (ng/sample)
2378-TCDD	0.95	*2378-TCDF	0.75
OTHER TCDD	1.75	*OTHER TCDF	0.85
12378-PCDD	0.97	12378-PCDF	1.1
OTHER PCDD	2.5	23478-PCDF	1.1
123478-HxCDD	1.4	OTHER PCDF	1.5
123678-HxCDD	1.0	123478-HxCDF	1.4
123789-HxCDD	2.9	123678-HxCDF	1.1
OTHER-HxCDD	1.2	123789-HxCDF	1.1
1234678-HpCDD	2.2	234678-HxCDF	1.3
OTHER HpCDD	1.4	OTHER HxCDF	2.6
OCDD	2.3	1234678-HpCDF	2.0
		1234789-HpCDF	2.6
		OTHER HpCDF	ND (0.01)
		OCDF	2.4

* From DB-225 GC column

TABLE 7-4
(continued)
U.S. EPA QUALITY ASSURANCE DIVISION
DIOXIN/FURAN AUDIT DATA

AUDITEE COMPANY Triangle Laboratories of RTP
ADDRESS 801 Capitola Inc.
Durham, NC 27713
AUDIT SAMPLE NO. 8863
DATA AUDIT SAMPLE RECEIVED 6/12/93
DATE ANALYZED 6/27/93
CONFIRMATION ANALYSIS USED: YES 2378-TCDF NO
AUDITEE'S NAME Don Harvan

COMPOUND	AUDITEE RESULTS (ng sample)	COMPOUND	AUDITEE RESULT (ng/sample)
2378-TCDD	0.47	*2378-TCDF	0.62
OTHER TCDD	0.83	*OTHER TCDF	0.58
12378-PCDD	0.48	12378-PCDF	0.57
OTHER PCDD	1.22	23478-PCDF	0.56
123478-HxCDD	0.64	OTHER PCDF	0.87
123678-HxCDD	0.51	123478-HxCDF	0.71
123789-HxCDD	1.3	123678-HxCDF	0.55
OTHER-HxCDD	0.65	123789-HxCDF	0.55
1234678-HpCDD	1.1	234678-HxCDF	0.70
OTHER HpCDD	0.7	OTHER HxCDF	1.29
OCDD	1.2	1234678-HpCDF	0.94
		1234789-HpCDF	1.2
		OTHER HpCDF	ND (0.01)
		OCDF	1.1

* From DB-225 GC column

TABLE 7-4
(continued)
U.S. EPA QUALITY ASSURANCE DIVISION
DIOXIN/FURAN AUDIT DATA

AUDITEE COMPANY Triangle Laboratories of RTP
ADDRESS 801 Capitola Inc.
Durham, NC 27713
AUDIT SAMPLE NO. 2782
DATA AUDIT SAMPLE RECEIVED 6/12/93
DATE ANALYZED 6/27/93
CONFIRMATION ANALYSIS USED: YES 2378-TCDF NO
AUDITEE'S NAME Don Harvan

COMPOUND	AUDITEE RESULTS (ng sample)	COMPOUND	AUDITEE RESULT (ng/sample)
2378-TCDD	0.17	*2378-TCDF	0.22
OTHER TCDD	0.31	*OTHER TCDF	0.23
12378-PCDD	0.17	12378-PCDF	0.19
OTHER PCDD	0.18	23478-PCDF	0.20
123478-HxCDD	0.23	OTHER PCDF	0.27
123678-HxCDD	0.19	123478-HxCDF	0.24
123789-HxCDD	0.48	123678-HxCDF	0.20
OTHER-HxCDD	0.2	123789-HxCDF	0.19
1234678-HpCDD	0.40	234678-HxCDF	0.24
OTHER HpCDD	0.24	OTHER HxCDF	0.43
OCDD	0.41	1234678-HpCDF	0.34
		1234789-HpCDF	0.44
		OTHER HpCDF	ND (0.01)
		OCDF	0.39

* From DB-225 GC column

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TABLE 7-5

METALS AUDIT SAMPLE LAB RESULTS

	Multi Metals Filters Low Level	Multi Metals Filters High Level
Elements	Reported Values (ug)	Reported Values (ug)
Beryllium (Be)	3.6	46.3
Cadmium (Cd)	6.8	58.7
Chromium (Cr)	8.8	63.3
Copper (Cu)	9.6	60.6
Phosphorus (P)	*	*
Lead (Pb)	43.4	302
Manganese (Mn)	9.3	60.3
Nickel (Ni)	19.8	274
Silver (Ag)	2.9	7.2
Zinc (Zn)	89	172
Arsenic (As)	6.8	15.0
Antimony (Sb)	4.0	6.5
Selenium (Se)	3.7	9.6
Thallium (Tl)	5.8	9.0
Mercury (Hg)	< 0.05	0.07

* Phosphorus not analyzed. No value reported.

SECTION 8
CLOSURE

8.1 MATERIAL RESOURCES

All of the Basin F liquid processed during the Trial Burn was obtained from storage tank TK-102. The excess drums of carbon tetrachloride and monochlorobenzene are currently being stored until the results of the Trial Burn have been approved. All remaining POHC liquids will then be burned in the SQI.

8.2 MATERIAL PROCESSED

From the beginning of Shakedown Testing on 28 April 1993 using 25% Basin F liquid through the end of Trial Burn Testing on 12 June 1993 using 100% Basin F liquid, 293,563 gallons of hazardous wastes have been processed in the SQI. All of the Basin F liquids burned to date have been from one of the three 1.3-million-gallon storage tanks (TK-101, -102, -103). During the Trial Burn an average feedrate of 176 lb/min was demonstrated. A minimum feedrate of 142 lb/min (Run #1) and a maximum feedrate of 188 lb/min (Run #3) was experienced during testing. A complete summary of the feedrate calculations is provided by the daily analysis reports in Appendices A.1.1 - A.1.3.

8.3 PROCESSED MATERIAL DISPOSITION

The material processed through the SQI was sampled and analyzed as stated in Section 5. The by-product of Basin F incineration is a brine solution, which is sampled and analyzed daily during routine operations by the on-site analytical laboratory. This liquid is transported by tank trucks to railroad cars located at RMA, which transport the brine off-site to a metals recycle facility. Transportation and disposal records for the brine solution are available from the Army.

SECTION 9
CONCLUSIONS

The primary objective of the Trial Burn test program was to maximize the Basin F liquid feedrate while simultaneously demonstrating the capability of the SQI to safely destroy organic contaminants in the incinerator discharge gases. The SQI successfully demonstrated a destruction and removal efficiency (DRE) greater than 99.999% for monochlorobenzene and greater than 99.9988% for carbon tetrachloride, both values well above the minimum regulatory limit of 99.99%.

During the three days of testing, the SQI operated smoothly and consistently with minimal upsets. During the first day of testing, stack sampling was temporarily stopped for approximately 100 minutes to clean waste feed nozzles. Days 2 and 3 proceeded without interruptions. The on-line availability of the SQI during Trial Burn testing was 92%.

Analytical results from stack testing indicate that the SQI effectively treated volatile and semivolatile organic contaminants in the Basin F liquid. Additionally, the air pollution control equipment controlled emissions of particulate and HCl to within regulatory limits.

9.1 RECOMMENDED OPERATING LIMITS

The SQI is currently operating under interim conditions, which were formally approved by EPA Region VIII in their letter to the Army (Ref: 8HWM-FF). The interim conditions were based upon the demonstrated results of the second mini-burn test, conducted 20 – 25 May 1993 using 100% Basin F waste. The post-Trial Burn cutoff values for interim operating conditions are provided in Table ES-1.

Table 9-1 represents the proposed waste feed cutoff values based upon previous testing and Trial Burn results. A brief description of each interlock value is provided.

Table 9-1

Waste Feed Cutoff Requirements

Parameter	Routine Operations
Liquid Feedrate (lb/min)	≥188 lb/min for 30 sec.
Residence Time (seconds)	≤2 sec. for 3 min.
Combustion Temperature (°F)	<1800°F for 0.5 sec.
Stack Oxygen	≤3% for 3 min. ≤1% for 5 sec.
Quench pH	≤4 instantaneous
Scrubber pH	≤5.25 for 30 sec.
Venturi Differential Press. (in. w.c.)	≤80 for 1 min.
Packed Tower Flowrate (gpm)	≤270 for 30 sec.
CO Hourly Rolling Average (ppm corrected to 7% O_2)	≤100 instantaneous
Venturi L/G Ratio (gallons/kcf)	≤9.3 instantaneous
Venturi Flowrate (gpm)	≤100 for 1 min.
Feed Nozzle Pressure (psig)	≤50 at >60 lb/min feedrate for 30 sec.
Compressor Outlet Pressure (psig)	≤85 instantaneous

9.1.1 Maximum Liquid Feedrate

During Trial Burn testing, the daily average feedrate for Basin F liquid varied between 171.1 - 179.9 lb/min. Each test day, POHCs were injected to determine DRE. All three test days had a DRE greater than the regulatory requirement of 99.99%. Therefore, it is proposed that the waste feed cutoff value be based upon the maximum instantaneous feedrate demonstrated during Trial Burn testing, which is 188 lb/min.

The average feedrate for the test runs was determined from the daily analysis report generated each test day (Appendix A.1.1 - A.1.3). The daily report generates minimum and maximum readings and calculates hourly averages for critical parameters, which were again averaged over the Trial Burn test period. For example, the 179.9 lb/min feedrate reported for run #3 is based upon a low reading of 172 lb/min and a high reading of 188 lb/min. The maximum instantaneous reading for run #1 was 185 lb/min and for run #2 was 184 lb/min. It is proposed that the waste feed cutoff value be based upon the maximum demonstrated instantaneous feedrate value of 188 lb/min, with a 30-second time delay to eliminate random waste feed trips caused by the introduction of liquid feed into the nozzle headers.

9.1.2 Minimum Residence Time

During Trial Burn testing, the residence time calculation varied between 2.67 - 2.81 seconds. This calculation is based upon the following formula:

$$\text{Residence Time (sec)} = \text{SQI chamber volume/gas flow rate (acfs)}$$

$$\text{ACFS} = \text{SCFS} \cdot \{(460 + \text{TY-34})/530\} \cdot \{(12.2/(12.2 + \text{PIT-31})\}$$

$$\text{SCFS} = \{(\text{FIT-16} + \text{FIT-09} + \text{FIT-30}) + \Sigma\text{FIT-15A/E} + (\text{FIT-04A} \cdot 21.5)\}/60$$

where:

TY-34: SQI chamber temperature
PIT-31: SQI chamber pressure
FIT-16: Primary combustion air flow to the burner
FIT-30: Secondary combustion air flow to the chamber
FIT-09: Natural gas flowrate
FIT-15A/E: Atomizing air flow to the waste feed nozzles
FIT-04A: Aqueous waste flowrate

This calculation is based upon parameters that are constantly changing as incinerator process conditions vary. To limit the waste feed cutoff value to the minimum demonstrated residence time would be overly restrictive, especially since the SQI is already regulated on many parameters used in the residence time calculation (e.g., waste feedrate, SQI chamber temperature, SQI chamber pressure, combustion air flowrate, etc.). It is proposed that the waste feed shutoff value remain ≤2 seconds for longer than 3 minutes, which is below the average demonstrated value but provides flexibility for the variable process conditions.

9.1.3 Minimum Combustion Temperature

During Trial Burn testing, the daily average SQI combustion chamber temperature varied from 1831 - 1842°F. A minimum temperature of 1804°F (run #1) and a maximum temperature of 1856°F (run #1 & 2) was experienced during testing. Chamber temperature is a critical parameter in determining DRE. As stated in Section 9.1.1, all three test days had a DRE greater than the regulatory requirement. In fact, throughout all of the previous mini-burn tests, the SQI has successfully passed DRE. During the first mini-burn test program, the incinerator passed DRE at a chamber temperature of 1760°F. Since the average value generated in the daily reports is based upon minimum and maximum readings, it is proposed that the minimum temperature shutoff value be 1800°F. This is well above

the demonstrated temperature from the first mini-burn test, and would allow a reasonable temperature span for SQI operations.

9.1.4 Minimum Stack Oxygen

During Trial Burn testing, the stack oxygen varied from 3.37% - 3.74%. The secondary air control valve (AIC-30) is able to maintain excess air within a close tolerance. It is requested that the current waste feed shutoff value of <3% for longer than 3 minutes remain unchanged. In addition, the low level oxygen shutoff of <1% for longer than 5 seconds would remain unchanged.

9.1.5 Minimum Quench pH

During Trial Burn testing, the quench pH probes (AE-64A/B) were not operating properly. Periodic field pH readings indicated that the quench liquid pH was significantly lower than recorded by the PMCS. The field readings were used during testing to control acid gas emissions. The quench pH field readings varied from 5.0 - 5.25. It is requested that the current waste feed shutoff value of <4 pH remain unchanged. This pH value was recommended by the equipment manufacturer for proper process operation and has remained unchanged throughout surrogate and Shakedown Testing.

9.1.6 Minimum Scrubber pH

During Trial Burn testing, the scrubber pH probes (AE-56A/B) were not operating consistently. Periodic field pH readings indicated that the scrubber pH was sometimes lower than recorded by the PMCS. The field readings were used during testing to control acid gas emissions. The scrubber pH field readings varied from 5.48 - 6.07. It is requested that the current waste feed shutoff value of <5.25 pH for longer than 30 seconds, which was demonstrated during the second mini-burn (Appendix A.3.2), remain unchanged.

9.1.7 Minimum Venturi Differential Pressure

During Trial Burn testing, the venturi differential pressure was maintained at 90" water column (wc). This pressure drop, coupled with the venturi recycle flowrate, resulted in acceptable particulate emissions. In order to provide margin between the 90" wc venturi differential pressure operating setpoint, it is requested that the current waste feed shutoff value of <80" wc for longer than 1 minute remain unchanged.

9.1.8 Minimum Packed Tower Flow

During Trial Burn testing, the scrubber packed tower recycle flowrate varied between 280 - 296 gpm. This recycle rate, coupled with the scrubber and quench tanks pH, is responsible for the HCl removal. Due to the very low emissions level, it is requested that the current waste feed shutoff value of <270 gpm for longer than 30 seconds remain unchanged.

9.1.9 Maximum CO Hourly Rolling Average

During Trial Burn testing, the carbon monoxide hourly rolling average varied between 47 - 58 ppm. It is requested that the current waste feed shutoff value of >100 ppm (corrected to 7% O_2) remain unchanged.

9.1.10 Minimum Venturi Flowrate

During Trial Burn testing, the venturi recycle flowrate varied between 125 - 128 gpm. This recycle flowrate, coupled with the pressure drop across the vanes, resulted in acceptable particulate emissions. During mini-burn #2 testing, this recycle flowrate was decreased to 100 gpm, which still resulted in acceptable particulate emissions. It is requested that the current waste feed shutoff value of <100 gpm for longer than 1 minute remain unchanged.

9.1.11 Minimum Feed Nozzle Pressure

The waste feed nozzle pressure is monitored by pressure transmitters PIT-27A/E. These values are displayed, but not recorded, by the PMCS. It is requested that the current waste feed shutoff value of <50 psig at flow rates >60 lb/min through a nozzle for longer than 30 seconds remain unchanged.

The feed nozzle shutoff value was established during Shakedown Testing when it was noted that backpressure recorded by pressure indicating transmitters PIT-27A through E rarely reached 50 psig. The pressure monitored at the nozzles fluctuated between 35 - 55 psig during waste feed operations. Subsequent discussions with the equipment vendor confirmed that the multi-port teat nozzles were designed for maximum turndown, so proper waste feed atomization is achieved by supplying sufficient atomizing air flow rather than a minimum liquid feedrate. By tying the interlock definition to the maximum design flow through a nozzle (60 lb/min) for longer than 30 seconds, the PMCS is capable of detecting a catastrophic nozzle failure.

9.1.12 Minimum Compressor Outlet Pressure

The waste feed atomizing air pressure is monitored by pressure transmitters PIT-18A/E. These values are displayed, but not recorded, by the PMCS. The header pressure is interlocked to the waste feed through pressure switch PSLL-13. It is requested that the current waste feed shutoff value of <85 psig remain unchanged to ensure proper atomization of the waste feed.